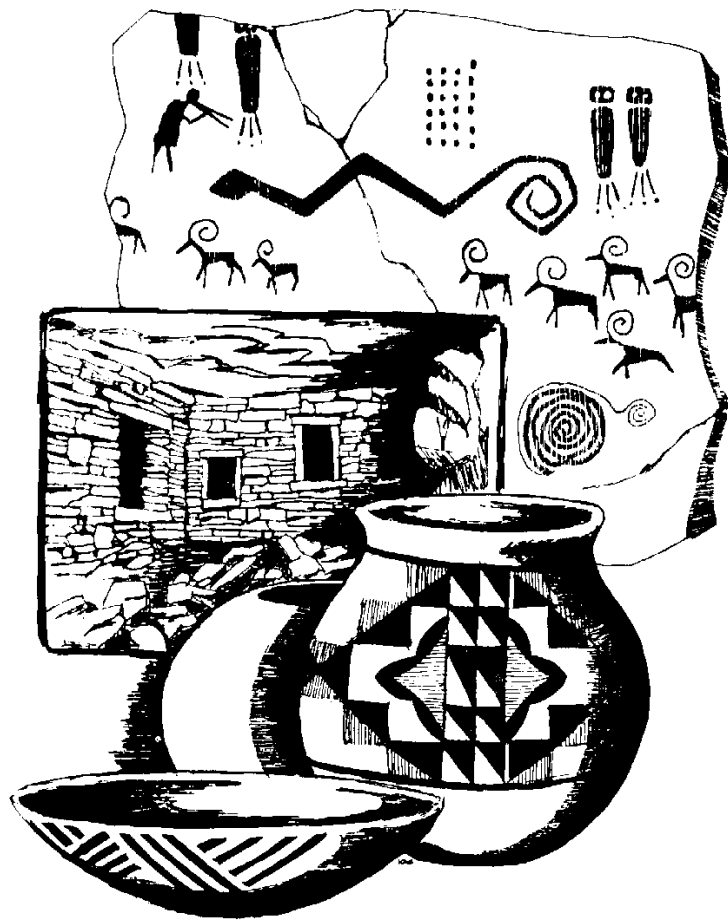


CHAPTER II MANAGEMENT SITUATION



CHAPTER II

MANAGEMENT SITUATION

Introduction

Chapter II the Management Situation is a condensation of the Analysis of the Management Situation, prepared originally in 1980 and updated through 1985 as additional information was validated. It provides a reference to the conditions that existed when the Forest Plan was prepared. It is included to provide future plan users an understanding of the emphasis given in the Forest Plan.

The Forest is made up of three divisions (see Figure I-1). It is managed by five Ranger Districts. The San Pitch Division and the west slope of the Manti Division forms the Sanpete Ranger District. The east side of the Manti Division is divided on the Huntington Canyon - Cottonwood Creek water divide, with the southern portion forming the Ferron Ranger District and the northern portion forming the Price Ranger District. The LaSal Mountain portion of the LaSal Division forms the Moab Ranger District. The Abajo (Blue Mountain) and Elk Ridge portion of the LaSal Division is the Monticello Ranger District.

Table II-1 shows landownership within the Forest's boundaries and the acreage by political subdivision.

Lands adjacent to the Forest in Sanpete Valley, the west slope of the San Pitch Division, the northern portion of Castle Valley, and east of the Abajo Mountains, are generally in private or State ownership. The Moab District surrounds a township that is in about half private and half State ownership. The balance of the lands adjoining the Forest are generally in public ownership.

Physical and Biological Setting

Physiography

The Forest is within the Dry Physiological Domain where, in general, the potential for annual losses of water through evaporation at the earth's surface exceed the annual water gains from precipitation. Major portions of the Forest are anomalies where precipitation generally exceeds the potential for evaporation.

The Manti and San Pitch Divisions are in the central portions of the Rocky Mountains Forest Province and are further divided into six land type associations including Lakes, High Plateaus, Ridges and Valleys, Eastern Clifflands, Monoclines and Rolling Basins. These surface features are the result of faulting, glaciation, and erosion. The LaSal Division is in the Colorado Plateau Province and is further subdivided into four land type associations, including High Mountains, Deep Canyons, Mountain Out slopes, and Mesas and Shallow Canyons. These surface features are a result of faulting, igneous intrusion, glaciation, and erosion.

Manti-LaSal National Forest

Acres	Net NFS	Non-Fed	Gross
INSIDE BOUNDARY			
<u>Sanpete Ranger District</u>			
Sanpete County		6,716	172,802
Utah County	166,086	110	11,944
Sevier County	11,834	0	51
Manti Division	51	6,826	184,797
	177,971		
Juab County		5,250	56,285
Sanpete County	51,035	1,872	19,875
San Pitch Division	18,003	7,122	76,160
	69,038		
DISTRICT TOTAL		13,948	260,957
	247,011		
<u>Ferron Ranger District</u>			
Emery County		11,811	159,689
Sanpete County	147,878	2,464	153,543
Sevier County	151,079	478	30,150
	29,672		
DISTRICT TOTAL		14,753	343,382
	378,629		
<u>Price Ranger District</u>			
Carbon County		8,507	38,709
Emery County	30,202	19,698	88,211
Sanpete County	68,513	12,469	57,937
Utah County	45,468	1,680	81,136
	79,456		
DISTRICT TOTAL		42,354	265,993
	223,639		
<u>Moab Ranger District</u>			
Grand County		2,691	60,221
San Juan County	57,530	3,384	87,292
Mesa County	83,908	40	4,582
Montrose County	4,542	0	22,563
	22,563		
DISTRICT TOTAL		6,115	174,658
	168,543		
<u>Monticello Ranger District</u>			
San Juan county		2,490	369,131
	366,641		
DISTRICT TOTAL		2,490	369,131
	366,641		
<u>Division Summary</u>			
San Pitch Division		7,122	76,160
Manti Division	69,038	63,933	794,172
LaSal Division	730,239	8,605	543,789
	535,184		
FOREST TOTAL (Inside Boundary)		79,660	1,414,121
	1,334,461		
OUTSIDE BOUNDARY			
		0	6
Ferron R.D., Emery County	6	0	1
Moab R.D., Grand County	1	0	21
Sanpete R.D., Sanpete County	21	0	2
Juab County	2		
		79,660	1,414,153
GRAND TOTAL	1,334,491		

Geology

MANTI DIVISION

The boundary of the Manti Division roughly corresponds with the structural limits of the Wasatch Plateau. This plateau is the northernmost portion of the High Plateaus of Utah. The eastern margin of the plateau is formed by an abrupt wall of barren cliffs and steep slopes, broken only by the V-shaped mouths of large canyons. It forms the great highland rim of the Colorado Plateau Region. This great escarpment is formed entirely by erosion, except for a small part near the town of Emery where some faulting is evident.

On the west, the margin of the plateau is hardly less abrupt than on the east, although the character is entirely different. The rock layers of the western margin bend downward toward the Sanpete and Sevier Valleys forming a monoclinal fold. The slope of the plateau front corresponds with the dip of the rock layers.

Major faulting falls into three separate zones or groups which have been described by Spieker as the North Gordon, Pleasant Valley, and Joe's Valley Fault zones. The rock layers between the major faults of each zone have dropped relative to the surrounding areas forming "grabens". The remainder of the plateau has experienced more minor faulting. The faults are considered normal in that beds on one side of the fault have down-dropped in relation to the other side. The fault planes that have been observed are vertical or nearly vertical.

The plateau surface ranges from 9,000 to 11,300 feet above sea level and 3,000 to 6,500 feet above the valley floors to the east and west. The higher levels present a striking contrast to the barren cliffs and rugged canyons of the east front.

Rock formations of the Wasatch Plateau are dominantly sedimentary in origin and range in age from upper Cretaceous to lower Eocene. They consist mostly of sandstone and shale, but also include beds of conglomerate, limestone, and siltstone. Their combined thickness in the plateau exceeds 10,000 feet. Generally, the rock strata are tilted at slight angles with a few locations lying nearly flat. However, some locations have been subjected to more disturbance and strata dip between 10 to 20 degrees. The stratigraphic units include the Mancos Shale through the Green River Formation. Figure II-1 presents the stratigraphic sequence of the formations, shows a brief description of their lithologies, and displays their relative ages. This figure also shows the relationship of the coal seams of the Wasatch Plateau Coal Field to the stratigraphy. The North Horn and Green River Formations generally tend to be naturally unstable due to their composition and structure. The coal bearing Blackhawk Formation also tends to be unstable, but to a lesser degree. Nearly all of the formations and soils of the plateau are susceptible to failures given the right conditions, such as steep slopes, water saturation and faulting.

SAN PITCH DIVISION

The San Pitch Division includes the northern portion of the Gunnison Plateau also known as the San Pitch Mountains. The Gunnison Plateau is part of the eastern margin of the Great Basin. Along the eastern bank of the Gunnison Plateau, rock layers are complexly folded. Faulting in the area is common and most faults tend to be normal faults. The Sevier-Sanpete Fault Zone (graben) trends north and south along the east bank of the Gunnison Plateau. Elevations range from approximately 5,600 feet in Sanpete Valley to 9,000 feet at the top of the plateau.

FIGURE II-1
GENERAL SECTION OF EXPOSED ROCK FORMATIONS
ON THE MANTI, SAN PITCH, AND LASAL DIVISIONS

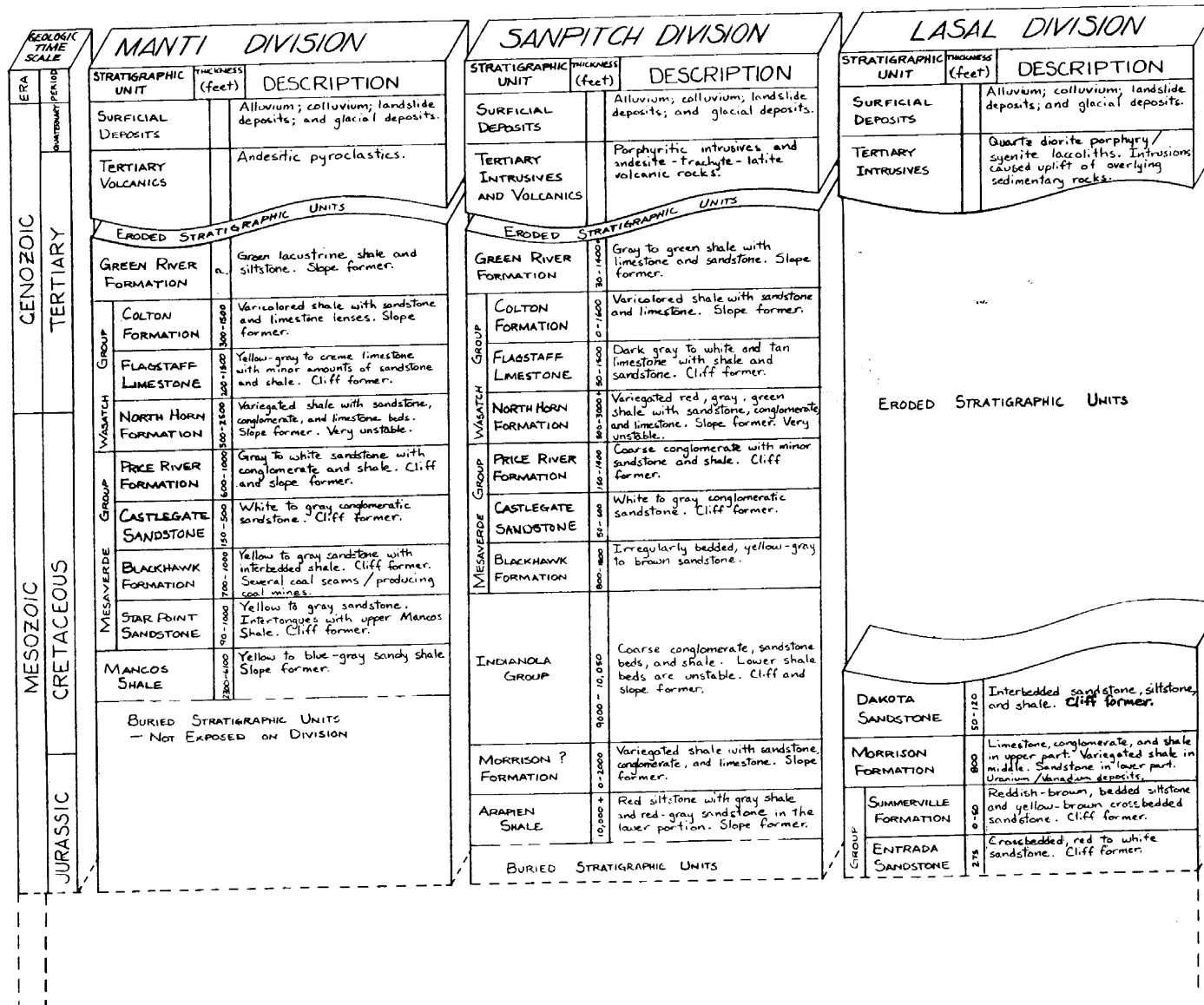
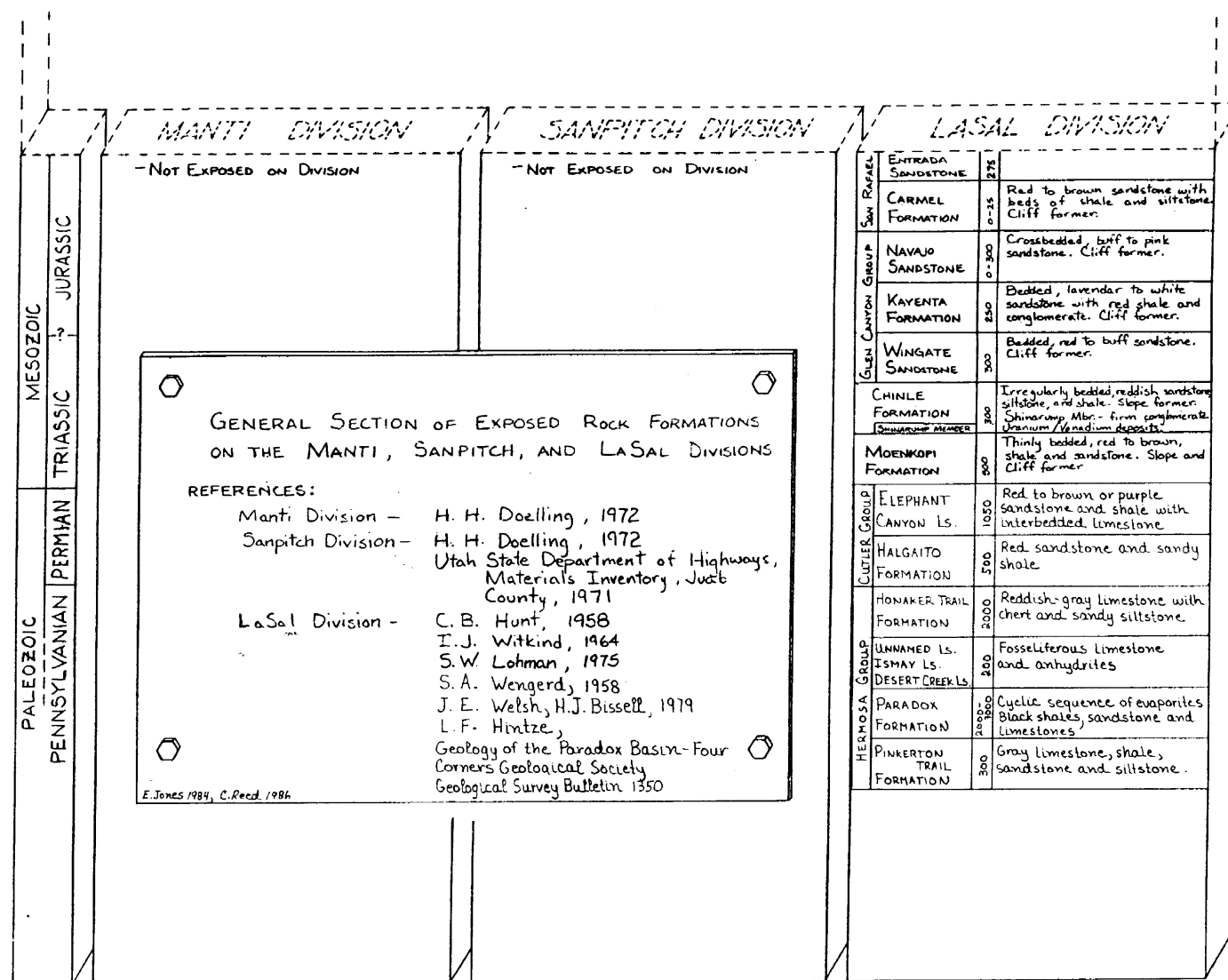


FIGURE II-1 (Continued)



Sedimentary strata exposed in the area ranges from Jurassic to Tertiary in age. A brief description of each rock unit is resented in Figure II-1. The Green River and North Horn Formations tend to be naturally unstable. This is also true of the Blackhawk Formation, but to a

lesser degree. Nearly all of the other exposed formations have potential for some degree of instability.

LASAL DIVISION

The Moab and Monticello Ranger Districts have very similar structures and stratigraphs though distinctly different from the Manti and San Pitch Divisions. Both Districts contain four distinct geographical features; high mountain areas, pediment slopes, mesa table lands and canyons. Elevations range from approximately 6,000 feet to nearly 13,000 feet.

Sedimentary strata exposed on the LaSal Division ranges from Pennsylvanian to Quarternary in age, having a thickness of about 5,000 feet. These rock layers overlie approximately 4,000 feet of unexposed sedimentary strata, Paleozoic in age, which rest upon Precambrian crystalline rocks (Figure II-1).

The local structural geology of both Districts is influenced by the intrusive LaSal (Moab) and Abajo (Monticello) Mountains. Regional structure of the Moab Ranger District area is controlled by the Uncompahgre Uplift (a high uplift located 25 miles north of the LaSal Mountains). Regional structure of the Monticello Ranger District area is mainly controlled by the Monument Upwarp, a broad low arch, and to a lesser degree by the Comb Monocline. The north ends of both structures are within the Elk Ridge area of the Monticello District.

The geology of the LaSal Division is also influenced by deformation caused by flowing of salt and gypsum deposits. High angel, normal faults are common on the LaSal Division. Faulting is associated with the igneous intrusives which formed the mountains, salt flowage, and regional structure. major faulting has formed well-defined grabens.

The sedimentary rock formations exposed on the LaSal Division are generally stable. The igneous rocks which formed the mountains have been exposed by erosion. Rock glaciers on steep slopes are commonly unstable.

Climate

Precipitation, 10 inches at lower elevations to nearly 35 inches at higher elevations, comes from Gulf Stream air masses during the summer and from Pacific air masses during the winter.

The average annual temperatures are 35 to 55 degrees Fahrenheit. The average annual frost-free period (the growing period) ranges from 120 to 20 days, decreasing with elevation. Some years, there is no definable frost free period at high elevations.

The prevailing wind pattern is from the southwest. Surface winds and velocities are influenced by topography, storm frontal activity, and diurnal temperature fluctuations, and may come from any direction

Soils

Soils on the Manti-LaSal National Forest vary considerably in relationship to the geologic, climatic, and topographic characteristics for the area. Most of the soils have formed from sedimentary rocks including sandstone, shale, and limestone. On the LaSal Division, quartz diorite porphyry is also a major rock type from which the soils have formed.

Most of the soils are well drained. The texture may range from loamy sand to clay. However, sandy loam to clay loam is the most common textural range. Soil depths are typically shallow to moderately deep (12 to 40 inches) with the exception of those soils developed on transported materials such as alluvium, colluvium, and glacial deposits. Stony or cobbly soils are common on most of the steep mountain slopes.

Most of the soils, except for those on some pinyon-juniper and spruce-fir sites, have dark colored surface horizons of eight inches or more in thickness (Mollisols). In addition to the good topsoil development, there is commonly an increase in clay content in the subsoil compared to the surface texture (Argillic horizon). The soils are moderately productive, but are being limited by short growing seasons due to cold temperatures at the high elevations and limited available moisture at the lower elevations. Between these extremes is a zone typified by the aspen vegetative type, which generally has the most productive soils.

High elevation rangelands have experienced significant losses of soil by erosion. The Manti Division is renowned for land instability and flooding. Landslides, debris avalanches, and mudflows are most prevalent on soils of the North Horn Geologic Formation, particularly where the land and bedrock slopes in the same direction.

Soil erodibility is moderate to high. The soils typically have textures of very fine sandy loam to silty clay and loam at the surface. The subsoils are generally finer textured and less permeable. The abundance of steep slopes and occurrence of intense summer thunderstorms are prime factors which relate to high erosion potentials when surface cover is removed.

The soil is recognized as a basic resource necessary for land productivity. Current management has concentrated on increasing vegetative cover and rapidly revegetating disturbed sites. Watershed rehabilitation, improved range management and reclamation stipulations relating to resource development activities have been key methods of improving and minimizing adverse effects on the soil. Watershed restoration projects cover approximately 32,500 acres, while approximately 45,000 additional acres have been identified as needing improvement.

An order 4 intensity level general soil inventory has been conducted on the entire Forest. A more detailed order 3 soil inventory has been completed on the Moab District and San Pitch Division with plans to have the Forest completed by 1992.

The continuing demand for Forest products requires an increase in the intensity of soil management in order to increase productivity. Also, the increase in demand for high quality water resources places additional emphasis on good soil management.

Landslide and Flood Events

The moisture year 1981 through 1984 were above normal in terms of snowpack and total precipitation. The 1983-1984 year broke all records for the Manti and San Pitch Divisions of the Forest.

Record moisture conditions combined with unstable soils and geologic conditions led to mass land

movements, mudflows, abnormally high runoff and flooding. Mass land movements and mudflows have impacted and seriously altered vegetation on 5,700 acres. About 167 miles of stream channels were scoured and widened so that existing sediment traps were lost. Some aquatic and riparian habitats within or adjacent to these channels were lost as a result of the scouring and stream channel widening. Surface instability has rendered about 1,200 acres temporarily unsuitable for livestock use and limited wildlife use. Most fisheries were destroyed in 70 miles of stream channel and severely damaged in 87 miles of stream channel. Damage to Forest facilities has also been extensive, including a loss of 113 miles of road on 50 different roads, 40 miles of trail on 24 separate trails, 8 bridges, 15 units in three campgrounds, and 22 miles of range fence. In addition, one lake and one reservoir were destroyed and two dams were breached to protect down stream values.

As authorized by Section 403 of the Agriculture Credit Act, considerable Emergency Watershed Protection (EWP) work has been completed. Through this program, many miles of stream channel clearing and riprapping, willow planting, and other revegetation has been done to provide some level of protection. Forest Service funds have supplemented the EWP program for vast seeding projects on disturbed land and additional erosion control projects for watershed protection.

Emergency Relief of Federally Operated (ERFO) roads repair funds from the Federal Highway Administration have provided funding to initiate repairs of portions of the damaged transportation system. However, actions taken to date, and expected activities under emergency programs will not totally repair the damage. Long-term repairs and rehabilitation needs have been summarized by Forest-wide Flood Damage Disaster Reports for 1983 and 1984.

Restoration of damaged areas or facilities can be locally important. Failure to restore campgrounds, roads, fisheries and range can severely impact those who use and depend upon these facilities or resources.

EXISTING SITUATION

Recreation - Recreation facilities have been damaged at Pinchot, Chicken Creek, Forks of Huntington, Oowah Lake and Ferron Canyon.

Fish and Wildlife - Riparian habitat, stream channels, and flood plains have been severely impacted along miles of stream. Landslides have and continue to deliver large amounts of sediment to streams. Stream channels and banks continue to erode, contributing large amounts of sediment to the streams and destroying fisheries.

Range - Damaged fences and lost access have increased the cost of operations to the permittees and the cost of management to the Forest Service. Control of livestock is more difficult. Customary livestock movement patterns have been altered.

Timber - The landslides and flooding have damaged over 5,000 acres of National Forest System lands. A portion of these acres contain conifer timber. Early surveys indicate a potential for insect build up which could further damage the timber resource.

Water - Several thousand acres of landslides and 70 miles of stream channel damage have created new and changing watershed conditions. New erosion areas have high sediment deliveries into the streams. Riparian areas have been denuded of vegetation destroying the capacity of these areas to trap and retain pollutants from upslope and destroying the shade that kept the waters cool enough

for trout. The riparian areas, instead of being a protection and buffer zone, have become a sediment source. Gravelly stream channels have been filled with silt. Downstream municipal and irrigation systems must contend with new and higher sediment loads until a level of stability is obtained.

Soils - Denuded soils are subject to severe surface erosion. Meandering streams have and continue to erode highly productive alluvial soils. Stream downcutting has lowered the water table and reduced the productivity of the riparian soils that remain.

Facilities (Roads and Trails) - The landslide and flood disasters of 1983 and 1984 have damaged arterial, collector, and local roads and trails. The associated high water has softened the road and trail prisms so that normal traffic does more damage and normal maintenance is far less effective. These conditions will continue until the area dries out, which is expected to take several years after the precipitation returns to normal levels.

Historic and Cultural Resources - Historical and cultural resources could have been destroyed by landslides and the rapid erosion of stream beds. However, no known historical and cultural sites were identified in the impacted areas.

Protection - The damaged access has made the protection job difficult. Slower initial attack for fires may mean that fires will do more damage before they are controlled.

Minerals - Loss of access increased some exploration and development costs. Greater costs could be incurred if active landslides need to be crossed to access lease areas.

Vegetation

Forest managers have controlled activities and uses that affect vegetation and growing conditions, since the Forest was established during the first decade of the 1900's. The objective of this management has been to provide and maintain a healthy, vigorous environment, capable of producing a range of outputs and conditions. Some vegetative types have been managed in a seral stage that allows for more diversity and higher productivity. In many cases, natural succession has occurred. There are consequences associated with managing vegetation, as well as with allowing natural succession to occur. Natural succession often leads to climax vegetative types that allow for less diversity, and lower productivity.

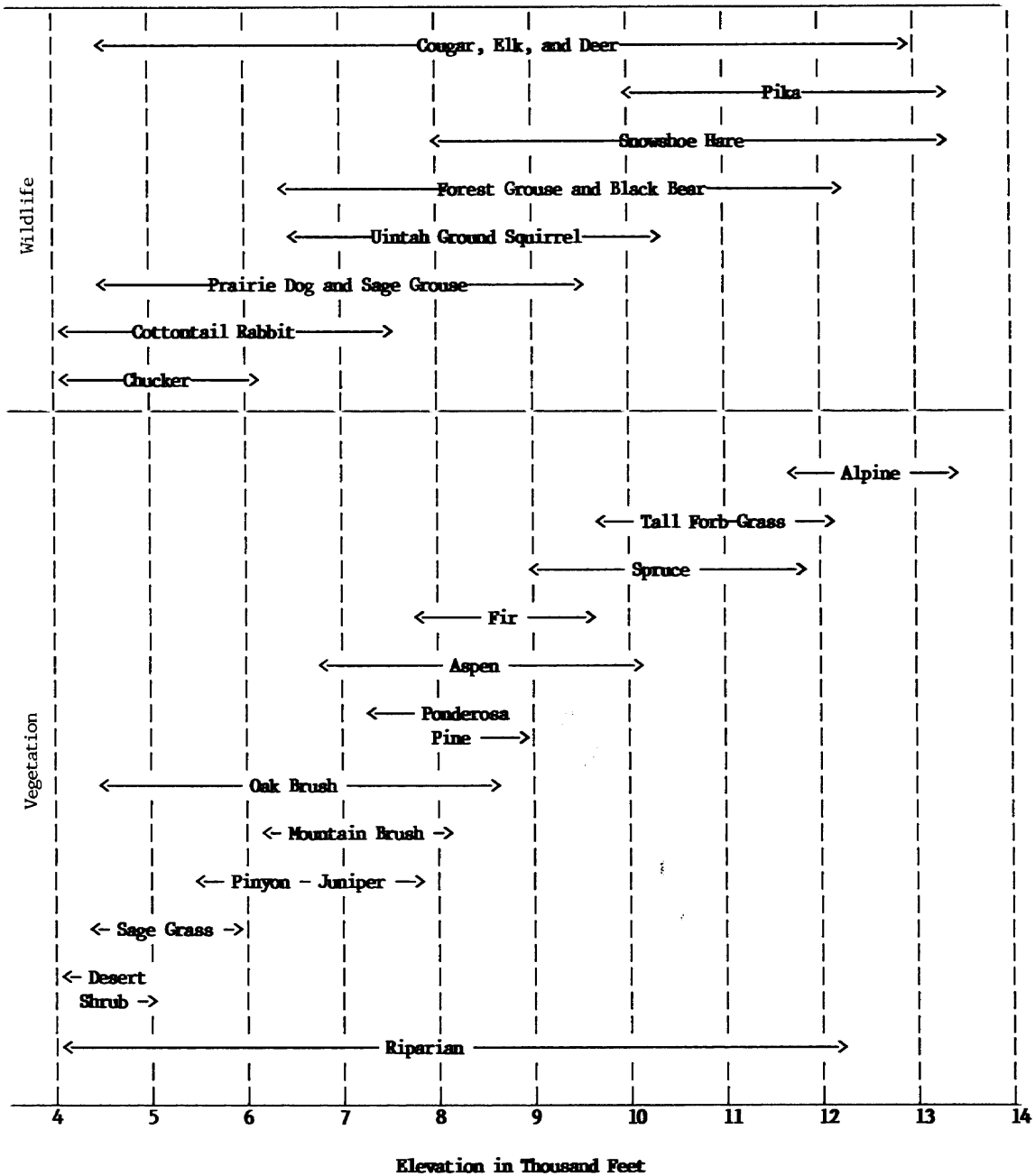
The hundreds of individual plant species which occur on the Forest may be classified into less than a dozen vegetation types. Each type lends unique character to the landscape and has an associated utility to society. Some vegetative types like those shown on Figure II-2 have narrow elevational ranges. Other types are more tolerant and have a wide elevational range. There are 11 major vegetative types on the Forest. They include: aspen, ponderosa pine, Douglas-fir, mountain brush, pinyon-juniper, sagebrush, and oak brush. The following is a discussion of the current condition and management needs of these types.

ALPINE

The alpine vegetation type occupies less than one percent of the Forest, and grows above native tree elevation limits. It is characterized by grasses, grasslike forbs, low shrubs, and poorly formed trees. Alpine vegetation provides a unique opportunity for scenic viewing particularly during the early summer when wildflowers are in bloom. The most important factors controlling the distribution and growth of alpine plants are available soil moisture and the production of viable seed. Wildlife habitat provided by this type supports elk and mule deer. Pika are unique to the alpine and subalpine types.

Figure II-2

TYPICAL VEGETATION AND WILDLIFE DISTRIBUTION CHANGES WITH ELEVATION



climatic conditions make this vegetation type very slow to recover. Alpine vegetation will perpetuate itself unless there is severe ground disturbance.

DOUGLAS-FIR

Douglas-fir generally occurs with ponderosa pine or aspen and occupies about two percent of the Forest, but is more important than its relative area implies. It typically occurs on steep, north-facing slopes at lower elevations, and is frequently the only conifer vegetation in a large area. On south-facing slopes, Douglas-fir occurs sparsely on rocky ridges, step hillsides, and canyon slopes.

Douglas-fir is a long-lived species which is valued for watershed protection, wildlife habitat diversity, scenic quality, and cover on big-game winter range. The type has not been harvested in the past, resulting in mostly mature and overmature stands. Thus, very little acreage of early successional stages of Douglas-fir are known to exist on the Forest.

Douglas-fir is a climax species that reproduces from seed. Without treatment, stands mature and die, but perpetuate the Douglas-fir type. Currently, the stands have a relatively uniform age structure. Natural succession will perpetuate the current uniform distribution.

SUBALPINE FORB GRASSLAND

Grass and forb vegetation types occupy 17 percent of the Forest and are interspersed with other vegetation types. In the subalpine type, they are extensive and rarely interspersed with aspen and spruce-fir types. Most grassland support, or are capable of supporting, numerous kinds of perennial grasses and forbs. Herbage production on mountain grasslands occasionally exceeds 3,000 pounds per acre; however, yields of 1,000 to 2,000 pounds per acre are much more common.

The forage produced in the grass and forb vegetation types is available for both wildlife and domestic livestock. The open nature of these vegetation types provides a great deal of scenic variety. Management is typically directed at increasing forage while maintaining visual quality.

ENGELMANN SPRUCE/SUBALPINE FIR (CONIFER)

Engelmann spruce and subalpine fir occupies eight percent of the Forest. This type occurs at mid to high elevations and represents the climax on the majority of the sites it occupies. This type usually occupies moist sites. Spruce can grow to over 300 years and fir to 250 years old. They naturally occur in single age stands, but can occur in 2, 3 or multi-story stands as a result of timber harvest or insect infestation. Its dense forest growth and layered appearance provides outstanding scenic views. It is also valued for wildlife habitat, watershed protection, and production of wood products.

Sixty percent of the type is overmature. As the spruce and fir type matures, the trees become susceptible to insect and disease infestations. A balance of structural stages is needed to enhance Forest health and vigor.

The spruce-fir type reproduces by seed, and it will reproduce itself naturally if not treated. The reproduction will retain the same age class distribution as currently exists. These types usually convert to aspen, if a natural catastrophe, such as a major fire, occurs.

ASPEN

The aspen vegetation type occupies 13 percent of the Forest and typically occurs at low and mid elevations interspersed with grasslands, meadows, spruce-fir and ponderosa pine Forest types. At the middle of its elevation range, it may be climax. Aspen stands on the Forest are typically mature to overmature with high disease and mortality levels.

Aspen is important to visual quality. Aspen color, form, and texture contribute to the character in many ways. These include edge contrast between aspen and conifer stands, aspen islands in large meadows, and massive textural blocks. Color is a dominant element in all distance zones, contrasting with surrounding coniferous vegetation, nonforest areas, bare rock, water and sky. The color change between seasons attracts many Forest visitors year-around.

Grasslands and associated aspen ranges often furnish a large part of the forage for livestock grazing on the National Forest.

The aspen ecosystem is important to wildlife. Deer and elk use aspen under six feet in height for forage. They use taller aspen for thermal and hiding cover. Aspen sprouts above snowcover are critical to winter diet in some areas. The grass, forb and shrub understory provide a summer food source as more forage is present than in conifer stands. Aspen forests are prime elk calving and deer fawning habitat. This is especially true on south slopes within one-fourth mile of water between winter and summer range. Aspen management in transitory big-game range helps support the animals longer in the spring and fall. This takes pressure off summer and winter range and provides extra forage during mild winters.

More songbirds are normally observed in aspen forests than in coniferous forests. Aspen provides food, nest sites, and cover for warblers, vireos, blue grouse, owls, raptors, thrushes, kinglets, and a variety of other birds. Small mammals such as shrews, moles, and mice derive their food, cover, and nest sites from aspen understory and leaf litter. Aspen along riparian areas is the basic food for beaver.

Overmature aspen stands are usually decadent and provide cavities and insects for bird and mammal species. Aspen stands are usually in close proximity to conifer stands that can provide cover during aspen regeneration.

Recently, there has been increasing interest in aspen for sawtimber, waferboard, particle board, and fuelwood.

Aspen regenerates almost exclusively through root sprouting. This results in clones which are genetically identical to the trees from which they originated. Trees within one clone are very homogeneous in such characteristics as rate of growth, form, vigor, resistance to disease, and time of leaf break and leaf fall. These characteristics often vary widely between clones due to genetic and site differences.

To stimulate root sprouting, the majority of aspen clones require a major disturbance that results in the death or removal of most or all of the existing trees. Wildfire has historically been the primary disturbance initiating root sprouting. Control of wildfire has permitted many aspen stands to become overmature with no means of regenerating themselves. In the absence of disturbance much of the aspen type is rapidly converting to conifer. This is shown by comparing the 1915 and 1965 timber inventories on the Manti Division. Aspen declined 34 percent, from 194,245 acres to 127,831 acres, during this period. The loss of this aspen has obvious resource implications. In order to maintain the aspen on the Forest, approximately 1,600 acres should be treated annually.

PONDEROSA PINE

This vegetation type occupies six percent of the Forest and occurs throughout the Forest. The LaSal Division has most of this type. It is located between 7,000 and 9,000 feet, either in pure stands or associated with aspen and oak brush. Ponderosa pine reproduces by seed. Natural regeneration requires the combination of a good seed crop, favorable seedbed conditions, and ample moisture in the spring following seed fall to assure germination and seedling survival.

Historically, low-intensity wildfires burned through ponderosa pine stands at frequent intervals. These fires had little effect on pole size or larger trees because of their thick bark. These fires prevented duff accumulations and kept competing vegetation in check, thus maintaining seedbed conditions favorable to ponderosa pine. Fire suppression over the past several decades has resulted in a buildup of organic litter, making seedbed conditions less favorable for ponderosa pine. Currently two distinct conditions exist on the Forest. The first is mature to overmature stands, open grown and generally poorly stocked, which need to be harvested and the areas regenerated. The second is stands released from an overstory which was removed during the earlier accelerated harvest. These stands are young, becoming stagnated or are stagnated and in need of thinning. Many of them are of minimum merchantability, being available for commercial thinning entries.

Ponderosa pine is important for timber production, livestock grazing, and wildlife habitat. Elk calving occurs in this type at lower elevations.

Ponderosa pine is considered a climax species on many of the sites on which it occurs, particularly near the center of its elevational range. Major disturbances, such as high-intensity fires, heavy logging, or widespread mortality from insect or disease infestations may cause ponderosa pine sites to revert to more seral stages such as aspen, oak brush, or grass. The mountain pine beetle is currently at high levels in some stands.

MOUNTAIN BRUSH

This vegetation type occupies six percent of the Forest and is dominated by one or more of the following species: serviceberry, rabbitbrush, snowberry, four-wing saltbrush, cliff rose, prunus species and mountain-mahogany. The primary value of the type is for wildlife habitat and domestic sheep range. It has particular importance when used as big-game winter range. There is a significant imbalance in the structural stages with most of the type in intermediate and late stages. Without disturbances such as fire or chaining, the type will maintain itself in the mature stages, or become decadent and be replaced.

PINYON-JUNIPER

This vegetation occupies 21 percent of the Forest. It is a widespread scrub woodland type generally occupying the lower elevations on the Forest.

The pinyon-juniper type occurs on the driest sites on the Forest and is the least productive type. Vegetation is characterized by small size and low growth rate. The type provides forage for wildlife and livestock, adds scenic variety to the landscape, and furnishes products such as fuelwood, posts, and Christmas trees. It is important cover on big-game winter range. Most of the type is estimated to be in the intermediate and late structural stages which reflects the lack of recent natural disturbance.

As a result of successional change, pinyon-juniper often expands into sage-grass sites. Many of the mature pinyon-juniper have little or no understory species. Many acres of pinyon-juniper have been treated through revegetation practices. These sites are now in the early seral stages of the pinyon-juniper successional chain. If not maintained, these sites will return to a more mature successional stage resulting in a decline in forage production as the pinyon-juniper dominates the site by taking moisture, nutrients, sunlight, etc., that the understory species need for survival.

SAGEBRUSH

This vegetation type occupies 10 percent of the total Forest and normally occurs on relatively dry sites at all elevations. Owing to climatic conditions, it is most common to lower elevations. Sagebrush can be an invader species that may eventually take over other sites. It provides a scenic desert-like landscape and forage for big game and occasionally livestock. Most of the type is in intermediate and late structural stages. Prescribed burning and mechanical or chemical treatment are used to treat this type when necessary to convert to other types.

OAK BRUSH

The oak brush vegetation type, principally Gambel oak, occupies 16 percent of the Forest and commonly occurs with vegetative types from ponderosa pine down to desert shrubs. At its lower elevation range, it is frequently associated with pinyon-juniper trees. At its upper limit it is often interspersed with aspen, Douglas-fir, or ponderosa pine.

The type provides watershed protection, retards snowmelt, provides browse for wildlife and domestic stock, and is a popular fuelwood species. Gambel oak is capable of reaching tree size on some sites. This savannah type and its associated understory provide highly productive useable forage for wildlife and livestock. The mature trees provide cavities for small mammal dens and non-game bird nests, and is important for accipiters such as sharp-shinned and copper hawks. Food production for deer and turkey is highest on these sites. Younger Gambel oak stands are often thick, severely restricting animal mobility, and shading out the more palatable grasses and forbs.

Currently, the majority of the Gambel oak type is estimated to be in an early seral stage. A more balanced structural distribution would improve this type for wildlife and domestic stock, and increase the landscape's visual diversity.

RIPARIAN

The riparian ecosystem type occupies one percent of the Forest and occurs in areas with year round high water tables. This type occurs at all vegetative transitional zones and consequently, most of the distinct vegetation types on the Forest are represented in riparian areas. The riparian area often includes willow, cottonwood and alder. These areas are typically located adjacent to streams and around springs, lakes, or bogs. While small in total area, they represent delicate, very important habitat for wildlife and fish. About 86 percent of the wildlife on the Forest are dependent on this vegetative for significant portions of their habitat. Normally, lush riparian vegetation serves as a sediment trap and improves quality of water runoff. Desirable forage production is high, and these areas are an important part of grazing allotments. The riparian type also provides visual diversity and some timber management potential. Riparian areas are important for recreation, as campgrounds are often built nearby and dispersed activities are popular.

Without protection and maintenance of this ecosystem, it may steadily decline.

NOXIOUS AND POISONOUS PLANTS

Noxious weeds occur at all elevations throughout the Forest, though control is mostly confined to the Manti Division. Musk thistle, white top and Canada thistle are the weeds targeted for major control efforts. Dyers woad, toad flax, and Russian knapweed are the other noxious weeds that are present on the Forest in small numbers. These weeds are also being controlled as available funding permits. Cooperation with Sanpete, Juab, Emery, and San Juan Counties weed control districts has helped with the control of many weeds growing along the Forest Development Roads and in other accessible areas on the Forest.

Poisonous range plants are one of the major causes of livestock loss on open range lands. Reported losses attributed to these plants average 700 animals per year. There are 21 species of plants that are considered poisonous to livestock on the Forest. Two species, tall larkspur (*Delphinium bankeyi*) and low larkspur (*Delphinium nelsonii*), have caused about 90 percent of the total loss.

Economic and Social Setting

Carbon, Emery, Grand, Juab, Sanpete, San Juan, and Utah Counties in Utah, and Mesa and Montrose Counties in Colorado are Counties which encompass the Forest and are affected by management of the Forest.

Economic factors of population, income, and employment are displayed by County and Human Resource Unit (HRU) for the base year 1980. The social analysis is discussed by Human Resource Units in the Social Setting section (following).

Population

Total population of the HRU's in 1980, based on the 1980 census and population projections from the Utah State Planning Office and the County Associations of Government, is 18,156 people.

Income

The average 1980 per capita income of the eight counties was about \$6,900, a 254 percent increase since 1970. The personal income was \$165.2 million in 1980.

Employment

Employment in the eight county area is estimated to be 61,300 jobs, of which 2.4 percent (1,448 jobs) are a direct result of activities on the Forest. Table II-2 shows how employment (influenced by the Forest) is distributed among various employment sectors. The population supported by that employment is 7,100. The average total unemployment for the Counties in 1980 was 5.5 percent.

TABLE II-2

EMPLOYMENT INFLUENCE OF THE
FOREST
IN MAN YEARS - 1980

Forest Service Programs	165
Minerals Industry	1,100
Recreation Industry	15
Timber Industry	10
Range Industry	154
Other Industry	<u>4</u>
Total	1,448

Payments to Counties

Each year, 25 percent of the value of receipts from Forest activities is returned to the State for distribution to the counties in which the Forest is located (see Table II-3). The following components comprise the receipts that make up the "25 percent fund".

-Value of Timber Harvested	-Mineral Permits
-Land Use Permits	-Recreation User Fees
-Recreation Permits	-Grazing Fees
-Power Permits	

A major source of funds to counties is from oil and gas and coal lease payments and royalties. These funds are distributed to the county by the Bureau of Land Management, the leasing agency, and are not included in the dollars shown in Table II-3.

Counties have also received Payments in Lieu of Taxes (PILT) funds. These payments are based on the number of acres of National Forest System lands in each county. This program of payments in lieu of taxes is dependent on annual Congressional appropriations, and is administered by the Bureau of Land Management.

TABLE II-3

PAYMENTS TO COUNTIES IN DOLLARS - 1980

County	State	25% Fund	Payments (In Lieu of Taxes)
Carbon	Utah	2,491	\$337,532
Emery	Utah	17,560	\$343,277
Grand	Utah	4,745	\$327,201
Juab	Utah	7,655	\$289,310
Sanpete	Utah	30,188	\$367,287
San Juan	Utah	37,164	\$401,777
Sevier	Utah	2,451	\$ 17,084
Mesa	Colorado	374	\$ 80,967
Montrose	Colorado	1,861	\$ 36,683

Forest Zone of Influence

The Forest Zone of Influence encompasses three Social Resource Units (SRU). Two of these SRU's contain Human Resource Units (HRU) where activities on the Forest directly influence communities and/or public welfare, and where community affairs can directly affect the Forest or its management. The SRU is an accumulation of HRU's, but where the community relationship to the Forest is indirect or less direct, and the issues are broader or regionally oriented. The three SRU's are described as follows.

WASATCH MEGALOPOLIS SOCIAL RESOURCE UNIT

The west escarpment of the Wasatch Mountains, Utah Lake, and the Great Salt Lake create boundaries to a corridor that is 100 miles long, and averages 10 miles wide. Within this corridor is the Wasatch Megalopolis, a rapidly growing, urban area with an industrial/commercial based economy. It is a major distribution and supply center for the Intermountain area. It contains the highest concentration of Black, Spanish American and Oriental minorities in the State.

Based on recreation use information, people from Wasatch Megalopolis account for 30 percent of the recreation use on the Forest, and may feel a vested interest in the Forest. Many are persons who left the small communities adjacent to the Forest during the 1940's and 1950's and who feel that a visit to the Forest is like going home. These people use the full range of recreation opportunities within the Forest. They are especially dependent on the Forest for big-game hunting, camping facilities, and to a lesser extent, fishing and fuelwood gathering.

CENTRAL UTAH SOCIAL RESOURCE UNIT

This SRU includes several HRU's in the Sevier River and Sanpete River Valleys, and the Juab Valley in Central Utah. The HRU's that have a direct relationship with the Manti-LaSal National Forest are the Juab and the Sanpete HRU's.

Human Resource Unit Description -The Juab HRU is bound by the San Pitch-Mount Nebo Divides on the east, by Long Ridge and West Hill on the west, by the ridge between Chris Creek and the Sevier River on the south, and by the ridge between Mona and Utah Lakes on the north. Communities in the valley include Nephi, Mona, and Levan.

The Sanpete HRU includes Sanpete Valley and extends into the Sevier River Valley to include Gunnison and the other nearby communities in Sanpete County. The HRU is bound by the Wasatch Plateau on the east, the San Pitch Mountains on the west, and the San Pitch-Thistle divide on the north.

Human Resource Unit Characteristics - Native Americans occupied the Sanpete HRU until the late 1840's and the Juab HRU until the early 1850's, when Mormon colonists settled these areas. The Mormon pattern of settlement was community living with commuting to farm and rangeland. Communities were established where water was available and at strategic locations to protect the travel-way from Salt Lake City to the settlements in Southern Utah. In the Juab HRU, the early trails have become modern highways and communities along these routes are important service centers to travelers. During the 1950 to 1970 period, the local economy of the Sanpete HRU could not support community growth causing an out-migration from the area. Improved access across the Wasatch Plateau in the early 1970's made it possible for local residents to commute and find employment in the power plants and coal mines adjacent to Castle Valley.

Some light industry has moved into both HRU's to take advantage of the labor supply. This has resulted in some community growth.

Agriculture and agricultural activities have always been an important factor in the communities of the Sanpete and Juab HRU's. Sanpete County ranks in the top 10 Counties in the United States as a producer of turkeys.

In the Sanpete HRU, mining is a reactively new job source, but has leveled off until low sulfur coal regains its prior importance. Locals commute outside the HRU to the mines in Salina Canyon or across the Plateau to mines in Huntington Canyon or Scofield (Pleasant Valley).

Both HRU's have light industry and manufacturing that is important to the local economy. In the Juab HRU, service industries cater to tourists or to the long haul truck industry. Snow College in the Sanpete HRU also provides some support to the local economy and adds to the lifestyle.

Commercial recreation activities include theaters, golf courses, and bowling. Communities support Little League Baseball, Bantam basketball, football, soccer and tennis programs. Churches and schools provide cultural events, dances, sports competition, and a myriad of other activities for members of the communities. However, these do not diminish the demand placed on the Forest to provide opportunities for hunting, fishing, camping, horseback riding, backpacking, cross country skiing and snowmobiling. Fuelwood gathering and cutting the family Christmas tree are a traditional part of the family activities.

The majority of the residents in both HRU's are favorable of Forest Service management activities in the HRU's. They are generally development oriented, and believe that the consumptive use of the Forest resources is appropriate. Maintenance of traditional uses and values is very important and residents recognize the need to protect high quality scenic values and recreation values which add to their economy or employment.

Both HRU's have the basic medical, educational, fire and law enforcement social services. Major medical and educational requirements are normally met in the larger population centers of the Wasatch Megalopolis.

Populations are increasing moderately throughout the HRU's with a larger percentage increase in communities such as Nephi and Ephraim which provide the greatest amenities.

The majority of the private land is used for farming. Some subdivisions of private land are occurring near communities and usually on land historically used for farming.

SOUTHEASTERN UTAH SOCIAL RESOURCE UNIT

This SRU is the Colorado Plateau area, bordered on the north by the Book Cliffs; on the west by the East Escarpment of the Wasatch Plateau, Thousand Lake Mountain and Boulder Mountain; on the south by the Utah-Arizona State line; and on the east by the Dolores River Valley. It is a large, lightly populated SRU with basic economics related to interstate transportation, mining, recreation, and some agriculture. In addition to the D&RGW Railroad, the area is crossed by I-70, US 50&6, US 191, and US 61. The unit contains major tourist attractions in three National Parks, three National Monuments, two State Monuments, six State Parks, and one National Recreation Area.

Three HRU's in Southeastern Utah SRU have a direct relationship with the Manti-LaSal National Forest. These are the Carbon-Emery, Moab, and San Juan-Abajo HRU's.

Human Resource Unit Descriptions - The Carbon-Emery HRU is bound on the north by the Book Cliffs, on the west by the water divide on the Wasatch Plateau, on the south by Interstate Highway 70, and on the east by the water divide in the San Rafael Swell. The communities in this HRU are Price, Helper, East Carbon, and Wellington in Carbon County; and Castle Dale, Orangeville, Huntington, Ferron, Cleveland, Elmo, Emery and Moore in Emery County. These communities are all in Castle Valley which lies between the East Escarpment of the Wasatch Plateau and the west edge of the San Rafael Swell.

The Moab HRU has indistinct boundaries. It is made up of communities adjacent to the LaSal Mountains. Beyond these communities, there is a vast desert area where suitable habitation is limited. The communities in this HRU include Moab and LaSal in Utah and Paradox and Gateway in Colorado.

The San Juan-Abajo HRU has indistinct boundaries. It is made up of communities adjacent to the Blue Mountains and the farms and ranches on the pediment that extends eastward into Colorado and southward toward the San Juan River. Suitable habitation to the north and west is limited by the desert and canyonlands. Communities include Blanding, Monticello, and Bluff. Half the population, Native Americans, live in scattered rancherias on the Navajo or Ute Reservations.

Human Resource Unit Characteristics - The first occupancy in the three HRU's of the Southeastern Utah SRU was by Native Americans in the San Juan-Abajo HRU as far back as 8000 B.C. There have been several periods when the area was settled then abandoned. Utes and Navajos were in this area when the first cattlemen arrived out of Colorado and New Mexico in the early 1820's. Communities were established in this HRU by the Mormon Colonists in the 1880's.

Mormon colonization in the Moab HRU area failed in the 1850's because of trouble with Native Americans, but was reestablished in the mid 1870's when cattlemen moved into the area.

The first colonization in the Carbon-Emery HRU occurred in 1877 by a group of Mormons.

Mormon settlements were based on a pattern of settling near water, community living and commuting to farms and ranches. Agriculture was the foundation for most early settlements. Mining became an important economic factor in the late 1800's in the Carbon-Emery and San Juan-Abajo HRU's. Early coal mining in the Carbon-Emery HRU was followed by the production of oil and gas. Beginning in the early 1970's, migration began to this area as a result of coal powered electrical generation development, the world oil shortage and a demand for low sulfur coal. Some gold and silver occurred into the early 1900's in the San Juan-Abajo HRU. In the early 1950's, mining of uranium and vanadium became important to the economy of the San Juan-Abajo and Moab HRU's, but a recent decline in the market for uranium has caused a near close down of this mineral industry.

Settlement was also augmented by the construction of the Denver Rio Grande Western Railroad in the late 1800's. New communities grew up by the railroad.

During the 1960's, tourism became an important industry for the Moab HRU, and to a lesser degree the other HRU's, as a result of the establishment of several State Parks and two National Parks in the area.

Some communities have grown because of the demand for support services and transportation to accommodate local industry, agriculture and government.

The major sources of employment in the San Juan-Abajo and Carbon-Emery HRU's are farming, ranching, mining, some light manufacturing and related support and transportation services. Electrical energy production is a big employer in the Carbon-Emery HRU. While mining and related activities are becoming less active in the Moab HRU, the tourist service industries are developing. Tourism also provides employment to the communities of the San Juan-Abajo HRU.

Price provides urban type amenities to those in the Carbon-Emery HRU, while rural amenities are available in many small communities in all three HRU's. Commercial recreation opportunities vary from community to community but include golf, bowling, theaters, rollerskating, and social clubs. The larger communities support baseball, football, swimming, tennis and related activities. Churches provide cultural, social and athletic activities for members of the communities. The public schools and the College of Eastern Utah in Price provide cultural and athletic activities, especially for the youth. On the Native American reservations of the San Juan-Abajo HRU, traditional activities still occur.

The Forest provides opportunities for hunting, fishing, vehicular travel use, camping, boating and picnicking, as well as fuelwood gathering. Winter activities including snowmobiling, cross country skiing and downhill skiing at Blue Mountain. Dark Canyon Wilderness provides limited primitive recreation opportunities. In the Carbon-Emery HRU there is a high ratio of four-wheel drive vehicles per capita, as well as off-road motorcycles, ATV's, campers and boats. The majority of the recreationists prefer dispersed area camping over developed site use. Local populations also depend upon the Forest for climatic relief.

The majority of the residents in all HRU's are favorable of Forest Service management activities. They are generally development oriented and believe that the consumptive use of Forest resources is appropriate. However, they want to maintain some traditions and traditional uses. They recognize the need to protect scenic and recreational values for economic and environmental reasons.

All HRU's have medical, educational, fire and law enforcement basic services. Major medical or social requirements are normally met in larger population centers in the Wasatch Megalopolis.

Population changes in the San Juan-Abajo HRU are generally equal between the two major communities, although other communities close to development activities are growing. The majority of the private land is used for farming.

Population fluctuations in the Moab HRU are confined to the Moab and Spanish Valley areas. The rest of the communities in this HRU are quite stable and experience little recent change. In the Carbon-Emery HRU, communities that provide the greatest amenities grow more rapidly and decline slower than the others. Development occurring in the north end of the HRU has encouraged growth to nearby communities. In these two HRU's, the majority of the land is used for ranching. Some subdivision of private land is occurring near communities and usually on land historically used for farming. In some areas, the private land in or adjacent to the Forest is used for second or recreational homes. Counties have adopted ordinances to control the type and amount of these developments.

Resource Elements

Table II-4 displays trends for key Forest resource outputs. Trends shown include estimated demand, output potential where management maximizes resource production (single-use emphasis), and output potential where management optimizes resource production with other resource outputs (multiple-use emphasis). For comparison purposes, the current level is also shown.

II-20

TABLE II-4
SUPPLY POTENTIAL AND EXPECTED DEMAND FOR FOREST RESOURCES

(In Annual Average Units)

Resource	Category	Present Level 1980	1986 1995	Time Periods 1996 2005	2006 2036
Developed Recreation in MRVD's	Estimated Demand		1,027	1,263	6,049
	Resource Maximum Capacity	987.0	835	1,159	2,271
	Multiple-Use Optimum Capacity		800		
Dispersed Recreation in MRVD's	Current Level			45	45
	Estimated Demand		45	45	45
	Resource Maximum Capacity	0.0	45	45	45
	Multiple-Use Optimum Capacity		45		
Wilderness Management in M-Acres	Current Level			29	39
	Estimated Demand		26	60	69
	Resource Maximum Capacity	32.0	50	55	61
	Multiple-Use Optimum Capacity		50		
Deer Habitat Capacity in M-Numbers	Current Level			32.0	42.0
	Estimated Demand		16.0	8.0	13.6
	Resource Maximum Capacity	4.4	6.0	6.5	8.0
	Multiple-use Optimum Capacity		5.0		
Elk Habitat Capacity in M-Numbers	Current Level			Not Estimated	
	Estimated Demand			165	181
	Resource Maximum Capacity	149.0	160	160	175
	Multiple-use Optimum Capacity		155		
Range Use Capacity in MAUM's	Current Level				0.6
	Estimated Demand		0.6	0.6	2.5
	Resource Maximum Capacity	1.0			1.1
	Multiple-use Optimum Capacity				
Timber Program Sales M-Cubic Ft	Current Level			Undefined	
	Estimated Demand				4.1
	Resource Maximum Capacity	1.9			2.5
	Multiple-use Optimum Capacity				
Fuelwood Program M-Cubic Ft	Current Level			Not Estimated	.731
	Estimated Demand			.731	.731
	Resource Maximum Capacity	.731	.731	.731	
	Multiple-use Optimum Capacity		.731	.731	
Water Yield Recreation in MRVD's	Current Level				50.0
	Estimated Demand			Undefined	50.0
	Resource Maximum Capacity	5.6	11.3	18.3	
	Multiple-use Optimum Capacity		11.3	17.3	
Coal Production in MM-Tons	Current Level			618	
	Estimated Demand		506	6,990	
	Resource Maximum Capacity	400	2,800	2,271	
	Multiple-use Optimum Capacity	400	1,080		
Current Level		358.0	400		
			1,448	1,764	

Recreation

Recreation pursuits include wood gathering, sightseeing, fishing, snowmobiling, camping, or just relaxing in the Forest environment. Recreation use is especially heavy during times when coal mines are shut down, on holidays, and during the big-game hunting season. People from the Wasatch front are attracted to the Forest by big-game hunts, and by opportunities for snowmobiling, camping, and sightseeing.

About one million recreation visitor days (RVD's) are spent on the Forest annually in diverse opportunities. The Recreation Opportunity Spectrum (ROS) System has been used in identifying the continuum of opportunities and stratifying them into classes for both developed and dispersed use. Each class contains important relationships among selected activities, preferred environmental settings, and expected recreational experiences. The ROS class experience levels are grouped as follows:

Primitive - Remote from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers a high degree of challenge and risk.

Semiprimitive Nonmotorized - Generally isolated from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk.

Semiprimitive Motorized - Some isolation from the sights and sounds of humans, independence, closeness to nature, tranquility, and self-reliance through the application of woodsman and outdoor skills in an environment that offers challenge and risk. Opportunity to have a high degree of interaction with the natural environment. Opportunity to use motorized equipment while in the area.

Roaded Natural Appearing - Less isolation from sights and sounds of humans. Opportunity to have a high degree of interaction with the natural environment. Challenge and risk opportunities associated with more primitive type of recreation are not very important. Practice and testing of outdoor skills might be important. Opportunities for both motorized and nonmotorized forms of recreation are possible.

Rural - High probability of affiliation with individuals and groups plus the convenience of developed sites and opportunities. These factors are generally more important than the setting of the physical environment. Opportunities for wildland challenge, risk-taking, and testing of outdoor skills is generally unimportant except for specific activities like downhill skiing, for which challenge and risk-taking are important elements.

DEVELOPED RECREATION

Developed recreation occurs at areas with facilities constructed especially for recreation. Developed public recreation sites on the Forest include: 20 family type campgrounds, four family type picnic grounds, one winter sports site, one boating site, seven minor interpretive sites associated with an auto tour, four isolated minor interpretive sites, three recreation residence subdivisions comprised of 34 total individual residences, and nine isolated recreation residences. There are two privately-owned resort type facilities under special-use permit. These developed recreation sites utilize 1,484 acres and can support approximately 415,000 RVD's annually under current site conditions.

The inventoried capacity of the National Forest is 5,192,000 developed RVD's of summer use on 11,395 acres. Table II-5 displays campground rehabilitation and expansion needs. Demand is projected at the same rate of increase as the local population. There is no inventory for developed winter use because of the limited demand.

TABLE II-5

CAMPGROUND REHABILITATION AND EXPANSION NEEDS

<u>Campground</u>	<u>Rehabilitation Year*</u>	<u>Expansion Year**</u>
Twelve Mile Flat	1976	1986
Manti Community	1982	1993
Pinchot (Vice) ***	1988	2007
Lake Hill	1993	2028
Maple Canyon	2004	2030+
Chicken Creek	1989	2014
Spring City	2030+	2030+
Ferron Reservoir	1983	1993
Joes Valley	1984	1995
Indian Creek	2030+	2030+
Ferron Canyon	2030+	2030+
Flat Canyon	1975	1981
Gooseberry	1984	1996
Forks of Huntington	1984	1996
Old Folks Flat	1984	1984
Fish Creek	1980	2030+
Buckeye	1981	1998
Pack Creek	1986	2004
Oowah Lake	2030+	2030+
Warner	2008+	2029
Dalton Springs	1973	1980
Buckboard	1990	2005
Red Bluff	1982	2018
Devil's Canyon	2007	2030+

* Based on projected use exceeding 20 percent of theoretical capacity.

** Based on projected use exceeding 30 percent of theoretical capacity.

*** Pinchot is to be replaced by another campground at a new location.

Use of National Forest developed recreation sites is approximately 240,000 RVD's annually. This use is expected to triple over the next 50 years. At this rate, demand for the Manti-LaSal National Forest is expected to exceed supply at some sites starting in the year 1990. Table II-6 displays developed recreation existing use and estimated demand use at the year 2030.

Near the Forest, there are ten State developed recreation areas and five National Parks, Monuments and Recreation areas. National and State parks in addition to Bureau of Land Management facilities are located at lower elevation and do not provide opportunities for people seeking high elevation

experiences typical of the National Forest System lands.

II-23

Private lands and some State lands have potential for recreation development within and adjacent to the Forest boundary. The current major use on private lands is for dispersed type recreation. There is a trend toward subdivisions for recreation residence development. Some lands, especially those next to reservoirs on the Forest possess a high recreational value.

TABLE II-6

DEVELOPED RECREATION EXISTING USE AND ESTIMATED DEMAND

<u>ROS Class</u>	<u>1980 Base</u>		<u>2030 Demand</u>	
	<u>RVD's</u>	<u>Gross Acres</u>	<u>RVD'S</u>	<u>Gross Acres</u>
Roaded Natural Appearing	131,750	1,054	256,616	2,836
Rural	<u>108,700</u>	<u>1,484</u>	<u>473,494</u>	<u>4,752</u>
Total	240,450	2,538	730,110	7,588

DISPERSED RECREATION

Dispersed recreation occurs outside of areas where facilities are built especially for recreation. It occurs mostly along or adjacent to roads, and includes activities such as driving for pleasure, camping, hiking or mechanized trail use, hunting, fishing, and wilderness travel.

Dispersed recreation use totals approximately 690,000 RVD's annually. Factors such as population growth, leisure time, and energy costs have an affect on this use. As dispersed recreation activities on the Forest increase, use will need to be controlled or limited in certain areas in order to reduce resource damage and/or conflict with other resource uses while maintaining the desired opportunities and quality of the recreation experience. Table II-7 displays dispersed recreation existing use and estimated demand at the year 2030.

TABLE II-7

DISPERSED RECREATION EXISTING USE AND ESTIMATED DEMAND

<u>ROS Class</u>	<u>1980 Base</u>		<u>2030 Demand</u>	
	<u>RVD's</u>	<u>Gross Acres</u>	<u>RVD'S</u>	<u>Gross Acres</u>
Primitive	2,806	48,082	20,800	48,082
Semiprimitive Nonmotorized	18,162	117,891	58,256	117,891
Semiprimitive Motorized	158,194	831,807	473,287	831,807
Roaded Natural Appearing	<u>524,036</u>	<u>413,672</u>	<u>1,587,912</u>	<u>413,672</u>
Total	703,198	1,411,452	2,140,255	1,411,452

Cultural, Historical, and Paleontological Resources

Sites displaying prehistoric and historic evidence of man and paleontological values constitute an important non-renewable resource of the Forest that have and can be adversely affected by natural forces, vandalism, and project implementation. In addition to protecting these resources, Forest activities should provide for general inventory and as appropriate, nominate sites to the National

Register of Historic Places, develop interpretive sites, and identify areas needing further inventory (see 36 CFR 219.24). Evaluation of sites by Forest personnel, consultants, or academic institutions is likely to increase and eventually lead to completion of the general inventory of sites on the Forest.

These resources found on the Forest are very diverse in type and size, because of a wide spectrum of vegetation, topography, time, and geologic formations.

PALEONTOLOGY

The North Horn Formation is well renowned for its unique and very important fossil mammals, dinosaurs, and lizards. A North American Provincial Land Mammal "Age", the Dragonian, is based on fossil mammals found on the Manti Division. Recent discoveries indicate the great potential for significant future studies in this formation. The known fossil producing portions of the North Horn Formation are found only within the Manti-LaSal National Forest.

The Morrison Formation is also known world-wide for its fossilized dinosaurs, mammals, and plants. Other formations likely to contain significant paleontological resources include the Dakota, Burro Canyon, Green River, and Blackhawk Formations. However, fossils are found in nearly all of the sedimentary rock formations exposed on the Forest, and important fossils could be found in any of them, including the unconsolidated Quaternary deposits as evidenced by the recent discovery of mastodon bones in the sediments of an ancient natural pond.

PALEO-INDIAN STAGE

A few isolated finds in Utah possibly relate to this earliest period of known human habitation in this part of North America a period of about 10,000 B.C. to about 5,000 B.C. None of these finds have been on this Forest, but the potential exists for such.

ARCHAIC STAGE

A reduction of vast herds of large game animals that Paleo-Indian apparently relied on may have led to the change in general lifestyle termed the Archaic. The relationship between Paleo and Archaic peoples is at present unknown. The Archaic may not necessarily be an out-growth of Paleo, but could have existed concurrently. Verifiable Archaic sites on the Manti-LaSal are few, less than one percent of the total, though some of the presently undatable lithic scatters could be from that period.

FREMONT CULTURE (MANTI DIVISION)

Sedentarism in the Fremont area began somewhere about A.D. 400 and is absent after about A.D. 1250. Evidence for a completely settled life is not found as much nomadic hunting and gathering, at least during certain seasons of the year, seems to have taken place even from people living in pithouse villages. Thus, rather than a complete change in lifestyle, Fremont subsistence could be a part of a general Archaic model where local populations exploit local resources. About 15 percent of the presently known and dateable sites on the Manti Division are from this period.

PUEBLO PEOPLES (MOSTLY MONTICELLO DISTRICT)

The Pueblo people were contemporary with the Fremont culture, but in a different location. These people first lived in pithouses and slab-lined rooms, later in villages of surface rooms (sometimes several stories) and still later in cliff structures. They cultivated crops, and apparently domesticated animals such as dogs, and turkeys. Small room blocks and single rooms can be found called "field

houses" for limited use while tending crops away from larger villages. Over 71 percent of the known sites on the Monticello Ranger District are Pueblo. The end of the 13th century A.D. saw a nearly complete abandonment of the area.

PREHISTORIC AND HISTORIC TIMES

Before the brief Spanish explorations in the late 1700's, Ute/Southern Paiute groups sparsely inhabited the region. In the early 1800's, the fur trade reached Utah. In the middle and late 1800's, Mormon colonization caused a great increase in population and changed visible lifestyles.

CURRENT USES AND MANAGEMENT

The Forest has collected and documented information about historic, prehistoric, cultural, and paleontological resources. This information is found in the following sources:

- Cultural resource surveys and overviews completed by various groups including local universities, contractors, and the Forest Service. These describe prehistoric sites on the Forest.
- An atlas of standard U.S. Geological Survey quadrangle maps marked with surveyed cultural resource sites and project boundaries. Access to the atlas by the general public is restricted to protect the sites from vandalism.
- A Forest Service computerized data base that indicates the presence or absence of cultural resource sites within a given land unit. The sole function of this source is to determine whether protection measures are needed for a project in a specific location. Access to the data base is restricted to protect the sites.

During the late 1950's and early 1960's, the archeological values on the Monticello Ranger District became apparent. Some actions at the time included recommendations for archeological withdrawals and the preparation of preliminary interpretive facility designs. These actions greatly anticipated the National Environmental Policy Act (NEPA) in 1969. NEPA led to the employment of an archeologist on the District to protect and manage the resource. The archeologist was also hired to fulfill the requirements of Executive Order 11593. This Executive Order required a complete inventory of sites on Federal lands, nomination of eligible sites to the National Register, and the preservation of significant cultural resources. The 1979 Archeological Resource Protection Act supported this Executive Order and made provisions for civil and criminal action to protect the resource.

Early Forest cultural inventories were sporadic and generally incomplete. However, beginning in the early 1970's, mostly on the Monticello Ranger District, large scale organized surveys were made by the Forest Archeologist in cooperation with Brigham Young University and Weber State College. During the mid 1970's, a private contractor surveyed the Manti Division in conjunction with coal leasing activities. In recent years, cultural surveys or cultural evaluations have been made prior to ground-disturbing activities. Protection measures are undertaken whenever a cultural or paleontological site is found. Through these inventories/evaluations, the Forest is gradually gaining any inventory of the resource. About eight to ten percent of the acreage of the Forest has been surveyed in mappable blocks. Very little analysis or long-term recommendation work has been done. No stabilization or interpretive work has taken place.

The location of known cultural and paleontological resource sites and areas of potential sites is kept confidential to protect them from vandalism. Vandalism of sites is currently increasing because of the high market values for artifacts. As an example, a reexamination of an area in 1985 showed 90 percent of the sites vandalized, where in the early 1970's, the areas showed less than 10 percent of the sites vandalized.

Many of the Forest administrative structures are over 50 years old and could be considered cultural resources. Most of these are structurally sound and in use. Others have outlived their usefulness or are beyond repair, and are being considered for demolition.

Older buildings within the Forest are being evaluated to determine their historic significance. Those found to qualify for the National Register of Historic Places will be nominated for inclusion. These facilities that are selected will be appropriately signed and interpreted.

Visual Resource

National Forest System lands provide a diversity of views in foreground, middleground, and background when viewed from on or off the Forest.

The Manti Division provides varied quality in viewing. Above average views are composed at high elevation plateaus, in canyon displaying a high degree of visual landscape diversity, around moderate to large size water impoundments, and at areas containing large, near vertical cliff escarpments. Below average views are composed of relatively flat appearing sagebrush covered expanses.

The Manti Division also serves as middleground and background when viewed from cities and towns such as Price, Huntington, and Orangeville on the east; Manti, Ephraim, and Fairview on the west; and Levan, west of the San Pitch Division.

Many areas on the Manti Division are visually sensitive because of the significant visual variety which is viewed by large numbers of recreation oriented visitors. These are areas where certain management activities would be highly visible and could cause a high degree of man-made visual contrast. Developed and dispersed recreation environments in Huntington Canyon, Joe's Valley (including Straight Canyon), Ferron Reservoir, Skyline Drive, Forest border slopes and escarpments are in this category.

The Moab Ranger District scenic attractions include mountain peaks and passes, forested lands and canyons. Spectacular viewing of the surrounding desert is also available. The Moab District serves as a scenic backdrop to Arches and Canyonlands National Park, the town of Moab, and to travelers along connecting highway systems.

Visually sensitive areas on the Moab Ranger District include the peaks, views from the LaSal Loop Road, Warner, Oowah, and Buckeye Reservoirs, and views from other major recreation areas on and off the Forest.

The Monticello Ranger District's timbered slopes of the Abajo Mountains provide a welcome middleground and background contrast to the sand and heat of the nearby desert. This view is available to Monticello and Blanding communities, to travelers along roads and highways throughout the area, and to visitors at the National Parks, monuments, and recreation areas in the Four Corners Region. Pictographs, petroglyphs, and stone dwellings are evidence of past civilizations and are interesting scenic attractions.

Road, Chippean Rocks, Federal and State highways, Monticello and Blanding communities, Hammond, Arch, Peavine, Dark and Woodenshoe Canyons, and National and State Parks.

Wildlife such as elk, deer, small mammals and birds are often seen throughout the entire Forest and add to the viewing experience.

SCENIC QUALITY

Scenic quality is divided into three major classes: Class "A", unique, distinctive, or outstanding landscape variety; Class "B", prevalent, usual, or widespread variety; Class "C", little or no visual variety. Table II-8 displays scenic quality for the San Pitch, Manti, Moab, and Monticello land areas.

TABLE II-8

FOREST SCENIC QUALITY (ACRES)

<u>Land Area</u>	<u>Class A</u>	<u>Class B</u>	<u>Class C</u>
San Pitch Division	2, 453	73, 707	- 0 -
Manti Division	147,861	605,863	40,448
Moab District	39,516	120,650	14,492
Monticello District	<u>116,134</u>	<u>207,856</u>	<u>45,141</u>
Total	305,964	1,008,076	100,081

VISUAL QUALITY

Visual quality is measured in five levels of excellence based on physical (scenic quality) and sociological (user's concern) characteristics of an area. It allows for an acceptable degree of alteration of the characteristic landscape. The level includes: preservation, retention, partial retention, modification, and maximum modification. Table II-9 displays Forest visual quality levels of the existing visual condition based on the 1980 planning inventory.

TABLE II-9

FOREST VISUAL QUALITY (ACRES)

<u>Land Area</u>	<u>Preservation</u>	<u>Existing Condition (1980)</u>			<u>Maximum Modification</u>
		<u>Retention</u>	<u>Partial Retention</u>	<u>Modification</u>	
San Pitch Division	- 0 -	2,717	40,583	32,860	- 0 -
Manti Division	- 0 -	133,679	408,391	249,743	2,539
Moab District	- 0 -	23,429	82,666	57,966	10,597
Monticello District	<u>45,529</u>	<u>69,523</u>	<u>136,199</u>	<u>111,143</u>	<u>6,736</u>
Total	45,529	229,348	667,839	451,712	19,692

The characteristic visual landscape is composed of interactions of existing vegetation, water, and landform on the line, form, color, and texture of the viewed scene. Since a large proportion of the Forest's vegetation is in a mature to over-mature condition, the characteristic landscape should change as the vegetation changes. Vegetation treatment could influence this change by regenerating vegetation to blend with or improve the existing landscape. Changes to the characteristic landscape through the natural successional processes such as wildfire, windthrow, or insect attack, could often be very large, contrasting, and could temporarily degrade the visual quality.

Many Forest users place high importance on visual quality. Maintenance of the visual resource should increase in importance as recreation use continues to grow.

Wilderness

Prior to the Colorado Wilderness Act of 1982 and the Utah Wilderness Act of 1984, the Forest planning process had developed an inventory of lands that were essentially unroaded and undeveloped. These met the minimum definition of wilderness, and qualified for wilderness evaluation per NFMA Regulation 219.17. The inventory contained 40 roadless areas, totalling 600,170 acres Forest-wide. This inventory and a description of each area was filed with the Forest's planning records.

The Utah Wilderness Act designated 706,736 acres State-wide, including the 45,000 acre Dark Canyon Wilderness on this Forest. Adjacent public lands administered by the Bureau of Land Management and National Recreation Area lands are being considered for wilderness and could add to the size and diversity of Dark Canyon Wilderness. The Colorado Wilderness Act did not designate any Manti-LaSal National Forest System lands as wilderness. Both laws released other National Forest System lands to other multiple use management until the next planning cycle. It is estimated that Dark Canyon Wilderness would meet the anticipated demand for wilderness in Utah during the first planning period. At the end of this period, and during the Forest Plan revision, the need for additional wilderness could again be evaluated. The total acres that are estimated to be available at that time is discussed in Chapter IV.

Dark Canyon represents the first major Colorado Plateau Canyon terrain to be added to the National Forest Wilderness System. This area is characterized by deep sandstone canyons with vertical walls ranging from a few hundred to thousands of feet in height, interspersed with pinyon-juniper benchland. It contains arches, springs, seeps and hanging gardens. Life zones range from ponderosa pine and aspen-covered high country to desert vegetation in the bottom of Dark Canyon at the National Forest boundary. High red rock canyons dwarf visitors with terraced castle-like walls towering 3,000 feet above the canyon floors. Wildlife species are diverse and include mule deer, some cougar and possibly desert bighorn sheep. The area also ranks high in archeological and scenic values. The Dark Canyon Wilderness current use and demand use are displayed in Table II-7 under the primitive ROS class.

Wildlife and Fish

The Manti-LaSal National Forest ranks first of the six National Forests in the State of Utah in projected potential to produce big game. According to the Intermountain Region's Wildlife and Fish Assessment data base, the Utah Division of Wildlife Resource (UDWR), in 1990, projects the Forest producing 28 percent of the elk in the State, 21 percent of the mule deer, 11 percent of the moose, 30 percent of the mountain goat, and 24 percent of the bighorn sheep. Table II-10 shows UDWR population estimates and goals for certain big-game species. How close UDWR's figures are to

actual populations is unknown. Presently, one-third of the elk and one-sixth of the mule deer harvested in the State are taken on the Forest. Additional hunting opportunities are provided by black bear, cougar, turkey, blue, sage and ruffed grouse, chukar, band tail pigeon, snowshoe hare, and cottontail rabbits.

There are 680 miles of streams on the Forest. About 167 miles have been severely damaged as a result of landslide and flood events of 1983 and 1984, leaving 513 miles currently fishable. There are 1,765 acres of lakes and reservoirs on the Forest.

TABLE II-10

UDWR POPULATION EXISTING AND DESIRED GOALS

	<u>1980 Population Estimate</u>	<u>1990 Desired Goal*</u>
Elk	4,390	6,600
Mule Deer	32,150	83,630**
Moose	50	200
Mountain Goat	0	200
Bighorn Sheep	55	170

*Obtained from the Intermountain Region Wildlife and Fish Assessment Data Base for the 1980 Regional Guide, August, 1981, and reflects UDWR goals without multiple use considerations or interaction between big-game species.

**Since these goals were established, the Interagency Committee has agreed to complete Interagency Herd Unit Plans which will establish individual herd unit population objectives. How close the herd unit population objectives will come to the UDWR desired goals is unknown.

FOREST SPECIES

Diversity in topography, vegetation, and climate on the Forest provides habitats for 368 vertebrate species of mammals, birds, reptiles, amphibians, and fish. General groupings of the species and their game status are shown in Table II-11. A complete species list and summary of habitat relationships are included in the Forest planning records.

TABLE II-11

NUMBER OF VERTEBRATE SPECIES
(Vertebrate Species of Southern Utah, Pub. No. 78-16 - UDWR)

	<u>Total Species</u>	<u>Game Species</u>
Mammals	94	19
Birds	216	9
Reptiles	29	0
Amphibians	8	0
Fishes	21	4
Total	<u>368</u>	<u>32</u>

Estimated 1980 populations of the primary game species are indicated in Table II-12. Population projections for small game and non-game species have not been made Forest-wide.

TABLE II-12

ESTIMATED 1980 POPULATIONS OF PRIMARY GAME SPECIES

Species	Population
Black Bear	375
Elk	4,390
Mountain Lion	300
Moose	50
Mule Deer	32,150
Turkey	100

MANAGEMENT INDICATOR SPECIES

Management Indicator Species (MIS) are a select group of species which can indicate change in habitat resulting from activities on the Forest.

Criteria used in selecting MIS include:

- Threatened, endangered, and sensitive species.
- Special habitat indicators.
- Economically or socially important species.
- Ecological indicators.

These criteria and the MIS concept are discussed in the Intermountain Region's Wildlife and Fish Assessment Data Base, August, 1981, pp. 1-5. Table II-13 lists the selected MIS and an index of habitat capability, based on the capability in 1980 as an index of 100 for each species.

TABLE II-13

INDEX OF HABITAT CAPABILITY FOR FOREST MIS

Indicator Species	Current (1980) Capability	Minimum Viable	Maximum Potential
Elk	100	48	310
Mule Deer	100	62	215
Macroinvertebrates	100	*	128
Blue Grouse	100	*	200
Golden Eagle	100	*	100
Albert Squirrel	100	80	350

*Data to determine minimum viable population is not available.

ROCKY MOUNTAIN ELK

Elk is an economically important species which occurs throughout the Forest and is hunted on four Districts. Hunting demand is high, increasing, and expected to continue increasing.

Elk use most Forest habitat types during different periods of the year. The limiting habitat factor is winter range on or adjacent to the Manti and San Pitch Divisions, and summer range on and off the LaSal Division. Calving area are important, but not limiting on all divisions. Elk are sensitive to activities occurring on their ranges and monitoring of projects is necessary to show the effects of land uses.

Management trade-offs may necessarily occur between elk and mule deer which could be reflected in population changes of both species.

The minimum viable population (MVP) of 2,125 is a threshold level below which the species cannot exist over time, within its present range. Existing population, 4,390, is the number on the Forest in 1980. The potential population, assuming lands on and off the Forest can provide winter habitat is 13,650, the maximum number National Forest System lands are capable of supporting using only soil and water protection limitations. The UDWR's desired population of 6,600 is the goal the State would like to see reached by 1990. The population trend is increasing.

MULE DEER

Mule deer is an economically important species occurring and hunted throughout the Forest. Hunting demand has been high, increasing, and is expected to continue increasing.

Mule deer are found in most Forest vegetation types. They are quite dependent on lower and mid-successional stages of shrub and timber types, and activities occurring in these areas can significantly affect mule deer populations. Monitoring this species will show the effects of Forest management.

Mule deer populations are limited by winter range on and adjacent to the Manti and San Pitch Divisions. A large percent of the winter range is in private holdings off Forest. Use of this habitat could be eliminated as a result of private lands uses at some point in the future. Thus, the management of key winter range on the Forest becomes very important.

The population estimates at different levels are as follows:

- a. Minimum viable population is 19,820;
- b. Existing (1980) population is 32,150;
- c. Potential population with multiple use considerations is 49,938; and
- d. State DWR desired population without multiple use considerations is 83,630.

The population trend is increasing.

ABERT SQUIRREL

The Abert squirrel is a Utah State high interest species found only on the Monticello District in Utah. Optimum Abert squirrel habitat is characterized by ponderosa pine stands with even-aged clumps of 12-19 inches D.B.H. and 45-75 foot height, with interlocking crowns and a ground cover of forbs, grasses, and shrubs. Several studies have shown Abert squirrels to have summer territories averaging 18-24 acres and winter territories averaging five acres.

By selecting Abert squirrel as a MIS, the species will be monitored to determine how timber management activities manipulate its habitat (mature ponderosa pine) and population. The basic habitat area of the squirrel will remain constant although population densities may change in the various areas with time or as a result of timber management.

Existing, potential, and UDWR desired population estimates are not available for Abert squirrels. It's present habitat of 79,925 acres of ponderosa pine is believed to be needed to support a minimum viable population. Currently, 2,200 acres of the total ponderosa pine acreage is unavailable for timber management activities due to steep slopes and rough terrain. These acres are generally mature ponderosa pine types and constitute poor to optimum Abert squirrel habitat. The remaining 77,725 acres of ponderosa pine available for timber management activities constitute from poor to optimum Abert squirrel habitat. Maintenance of healthy ponderosa pine timber stands should sustain the Abert squirrel within its present range. Abert squirrel population trend is stable.

BLUE GROUSE

Blue grouse, hunted on all Districts, is closely tied to several vegetative types occurring above 6,500 feet in elevation on the Forest. Breeding males require areas of escape cover in open timber stands adjacent to open sagebrush/grass/forb habitat types. The edges are most heavily used. Males display in the open areas. Females require nesting cover on the ground, usually sagebrush or other dense brush. Females usually nest in the territory of the male they mate with. Brooding cover, tall grasses and tall forbs (12-15 inches high), is usually found along the edge between timber stands and sagebrush flats. Blue grouse move to higher elevations in the winter and require mature conifer stands. Douglas-fir is preferred.

Management activities can impact habitat and result in population changes. Logging and roading mature conifer stands may reduce winter habitat. Ecotones between timber and shrub/grass habitats may be altered by logging and/or range vegetative manipulations. Pesticide spraying in shrub/grass habitat reduces the prey base (insects) in brooding areas. Livestock grazing reduces brood cover in many areas.

The DWR annually collects summer inventory and harvest data which should indicate how management affects blue grouse.

On the Manti-LaSal National Forest, there are approximately 244,000 acres of marginal timber lands. Of this total, it is estimated that 100,00 acres would be required to maintain the blue grouse within its present range. Winter feeding areas are considered to be the limiting factor for blue grouse production.

Though population estimates of blue grouse are not available, according to the Utah State Division of Wildlife Resources, the population trend is stable.

The golden eagle is a State and Federal high interest species found on all Districts. They use most vegetative types found throughout the Forest. Their nest sites are generally localized in escarpment areas, and are usually found in undisturbed areas. During nesting and brooding seasons (mid-February to mid-July) activities in active nest site areas may impact golden eagle populations. Monitoring this MIS should determine how these activities affect golden eagles.

Existing, potential, and UDWR desired population estimates of golden eagles are not available. The optimum number of golden eagles on the Manti-LaSal National Forest was estimated using the fact that a breeding pair requires a territory up to 30 square miles in size. Dividing the total Forest area (1,334,491 acres) into 30 square mile units would provide habitat for a maximum of 69 breeding pairs.

MACROINVERTEBRATES (Aquatic Insects)

Macroinvertebrates are ecological indicator species in aquatic habitats and the ability of that habitat to support fisheries. Habitat requirements for aquatic macroinvertebrates vary with species. Habitat requirements for any one species are very specific.

Aquatic habitat on the Forest consists of 680 miles of stream fisheries and 1,765 acres of lakes and reservoirs. Macroinvertebrates are found in these areas. Tunnels and canals, which carry water, may also provide habitat for macroinvertebrates. These habitats can be monitored for macroinvertebrates on a priority basis as needed to determine the specific effects of any one project or activity, as well as the effects of general Forest land management, on the aquatic resources. The number and variety of macroinvertebrates found express the quality and quantity of the aquatic habitat. Changes in aquatic habitats, resulting from activities in the terrestrial habitat, are rapidly seen through changes in the species composition and biomass of macroinvertebrates.

Any serious concerns about habitat conditions beyond MVP levels should be addressed under well defined procedures outlined in the R-4 General Aquatic Wildlife System (GAWS) and the publication "Aquatic Ecosystem Inventory - Macroinvertebrate Analysis" published by USFS, Intermountain Region, October, 1979. The following list of macroinvertebrate species is considered minimal to accomplish any meaningful assessment of the aquatic ecosystem, and may be utilized essentially as one MIS:

Epeorus Species - Mayfly - Requires good water quality and good instream habitat. Must have a resident population.

Zapada Species - Stonefly - Depends upon allochthonous leaf litter for nutrients. Relative numbers generally indicate riparian habitat quality and quantity. Best when sampled in fall.

Ephemerella doddsi - Mayfly - Requires good water quality and good instream habitat. Relative numbers can indicate habitat quality.

Ephemerella inermis - Mayfly - Moderately tolerant to sedimentation. Good red-flag species when their numbers increase.

Chironomidae species - Dipteran - Highly tolerant to multiple forms of pollution. Particularly tolerant to sedimentation. Often dominate the community when pollution is severe.

Table II-14 shows the 1980 and projected demand for wildlife and fish through the planning period.

Hunting demand for elk has increased since open bull seasons were implemented (1967 for the Manti Division, 1970 for the LaSal Mountains) and this trend is expected to continue. Elk hunting pressure on the Forest has averaged about 28 percent of the State's total over the last 10 years.

Stream habitat for fisheries is estimated to be about 25-30 percent of its potential. This is due to historic land abuse and recent mud slides and associated flooding. Improvement of stream habitat and construction and /or reconstruction of flat water fisheries will aid in meeting the projected demand for fishing.

Mule deer numbers have been less than the carrying capacity of their key habitat for much of the last decade. These numbers are gradually increasing. The increase of numbers will aid in meeting the expected demand for deer hunting.

TABLE II-14

PROJECTED DEMAND FOR WILDLIFE AND FISH
WILDLIFE AND FISH USER DAYS (WFUD)

<u>Year</u>	<u>Mule Deer WFUD</u>	<u>Elk WFUD</u>	<u>Fish WFUD</u>	<u>Total WFUD</u>
1980	34,051	12,241	52,198	98,490
1990	49,664	37,753	98,569	185,986
2000	56,423	53,249	123,663	233,335
2010	63,180	68,742	148,751	296,169
2020	69,939	84,238	173,846	328,023
2030	76,695	99,732	198,934	375,361

ENDANGERED, THREATENED, AND SENSITIVE SPECIES

The following definitions are applicable to these species:

Endangered Species - Any species listed in the Federal Register which is in danger of extinction throughout all or a significant portion of its range.

Threatened Species - Any species listed in the Federal Register which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Sensitive Species - Any species which (1) has appeared in the Federal Register as proposed for classification as T&E and/or is presently under consideration for official listing, or (2) is recognized by the Regional Forester to need special management in order to prevent them from being placed on a Federal or State list.

There are extensive guidelines for endangered, threatened and sensitive species including the Endangered Species Act of 1973 (PL-93-205); Forest Service National Policy; the Manti-LaSal National Forest Endangered, Threatened and Sensitive Species Management Plan; and the Regional Forester's Endangered, Threatened and Sensitive Animal and Plant list. Special attention is necessary for the environmental needs and habitat management for those species listed as endangered, threatened, and sensitive, which are dependent upon the Forest.

Table II-15 lists the endangered, threatened, and sensitive plants, mammals, birds, amphibians, and reptiles found on the Forest.

The Bald Eagle is a winter migrant and is found in Joe's Valley and Castle Valley Ridge. Roosting areas have been located in Four-Mile Canyon and north of Indianola. Except for the roosting areas, no National Forest System lands on the Manti-LaSal National Forest are considered to be critical or essential for Bald Eagle. Winter surveys indicate approximately four eagles use the Joe's Valley area and 12 use the Castle Valley Ridge area each winter. The roosting areas have not yet been surveyed.

During the spring of 1984, a breeding pair of peregrine falcons was located on the Monticello District. Surveys need to be completed to determine the habitat and extent of use of this pair or others on National Forest System lands.

River otter have recently (within the last 15 years) been located on National Forest System lands in the vicinity of Potters Pond. Additional surveys are needed to determine the viability and extent of the population and its critical habitat requirements.

Little information is available on the other animal species listed as sensitive. As information becomes available, appropriate actions will be taken to maintain and/or increase the number with the goal of taking the animals off the list.

There is one plant species, Echinocereus triglochidiatus var. inermis, on the Forest which is officially listed as endangered. Thirteen other species are considered as sensitive.

Astragalus montii has been proposed for listing as a threatened species by the USDI Fish and Wildlife Service.

All the endangered, threatened, and sensitive plant species are protected, studied, and maintained under the guidelines set forth in the Endangered Species Act of 1973, the Forest Service Manual, National Policy and Guidelines for Sensitive Species, and the Manti-LaSal National Forest's Endangered, Threatened, and Sensitive Species Management Plan.

With the exception of the Bald Eagle roosts (mentioned above) no population trends or critical or essential habitat has been established or determined for any of the sensitive or endangered species located on the Forest. Studies have been established and plans initiated to determine species distribution and essential habitat on the Forest.

Habitat for most of the sensitive and endangered plant species is located within livestock grazing allotments. As allotment plans are developed, protection of these species is made part of the plan. Protective measures may include grazing of the habitat area only after the plant has completed its annual life cycle, grazing at a time when the plant is least sensitive, fencing the habitat areas, and elimination or reduction of grazing.

TABLE II-15

THREATENED, ENDANGERED, AND SENSITIVE SPECIES
FOUND ON THE FOREST

<u>Species</u>	<u>Status</u>
<u>Plants</u>	
Astragalus desereticus (Deseret milkvetch)	Sensitive
Astragalus iselyi (Isley milkvetch)	Sensitive
Astragalus montii (Heliotrope milkvetch)	Sensitive*
Carex scirpoidea var. curatorum (None)	Sensitive
Cryptantha creutzfeldtii (Creutzfeld catseye)	Sensitive
Echinocereus triglochidiatus inermis (Spineless hedgehog cactus)	Endangered
Erigeron mancus (LaSal daisy)	Sensitive
Festuca dasyclada (Sedge fescue)	Sensitive
Hedysarum occidentale var. canone (Canyon sweetvetch)	Sensitive
Hymenoxys depressa (Low hymenoxys)	Sensitive
Hymenoxys helenioides (Helenium hymenoxys)	Sensitive
Penstemon tidestromii (Tidestrom beardtongue)	Sensitive
Senecio dimorphyllus var. intermedius (Intermediate groundsel)	Sensitive
Silene petersonii (Plateau catchfly)	Sensitive
<u>Mammals</u>	
Sciurus aberti (Abert squirrel)	Sensitive
Lutra canadensis (River otter)	Sensitive
Ochotona princeps-moorei (Moores pika)	Sensitive
Euderma maculatum (Spotted bat)	Sensitive
<u>Birds</u>	
Haliaeetus leucocephalus (Bald Eagle)	Endangered
Falco peregrinus (Peregrine falcon)	Endangered
Aquila chrysaetos (Golden Eagle)	Sensitive
Accipiter cooperii (Cooper hawk)	Sensitive
Asyndesmus lewis (Lewis woodpecker)	Sensitive
Coccyzus americanus (Yellowbilled cuckoo)	Sensitive
<u>Amphibians</u>	
Hyla arenicolor (Canyon tree frog)	Sensitive
<u>Reptiles</u>	
Diadophis punctatus regalis (Regal ringneck snake)	Sensitive
Xantusia vigilis utahensis (Utah night lizard)	Sensitive
Opheodrys vernalis blanchardi (Western smooth green snake)	Sensitive
Lampropeltis pyromelana var. infralabialis (Utah mountain king snake)	Sensitive
Lampropeltis triangulum var. taylori (Utah milk snake)	Sensitive
<u>Summary</u>	
Federally Listed (Endangered)	3
Sensitive	27

*Proposed for listing by the USF&WS

HABITAT DIVERSITY

Forest wildlife species depend on a variety of vegetation and different growth stages for habitat. Certain species such as goshawks depend on the late succession or mature forest stages for nesting. Mule deer and elk need early structural stages (seral) for feeding and mid and late stages for protective cover from predators and shelter from the elements. Few of the species are exclusively dependent on any one structural stage. The Forest condition that best provides wildlife diversity is one that contains structural stages in a well distributed mosaic of vegetation types and stages.

Range

Table II-16 is a summary of the range resource on the Forest.

TABLE II-16

RANGE RESOURCE SUMMARY RANGE CONDITION, TREND, AND VEGETATIVE TYPES

	Acres, Range Suitable for Grazing and Browsing	Acres, Range Suitable for Livestock Grazing
Acres of Range	1,212,846	651,481
Range Forage Condition*		
Acres Good	122,278	78,399
Fair	655,853	449,963
Poor	210,876	123,119
Unclassified (7 & 7T Types)	223,839	0
Total	1,212,846	651,481
Ecological Trends*		
Acres Up Trend	37,411	32,686
Not Apparent	841,317	527,417
Down Trend	110,279	91,378
Total	989,007	651,481
Vegetative Types		
1. Grasslands	176,627	162,558
2D. Dry Meadow	4,441	4,441
2W. Wet Meadow	887	887
3. Perennial Forb	26,035	22,553
4. Sagebrush	117,550	93,811
5. Browse-Shrub	264,114	129,186
6. Coniferous	204,375	81,836
9. Pinyon-Juniper	252,643	14,778
10. Aspen	158,893	134,585
20. Reseeded Lands	7,281	6,846
Total	1,212,846	651,481

*Condition and trend figures are based on formal inventory procedures, some of which are over 20 years old. A more current inventory would reflect slightly more acres in the higher condition classes.

There are 144 designated grazing allotments on the Forest comprised of 47 cattle and 97 sheep allotments. At present, most of the allotments are being grazed at or near their estimated grazing capacities, although some allotments are over obligated.

The Forest has permits for 20,730 cattle and 84,913 head of sheep. The 1980 permitted AUM obligation for the Forest was 175,334. This is 23,648 AUM's over the 151,686 actually being grazed. The difference between permitted and actual use is shown on non-use agreements for: (1) reduced stocking range protection, (2) reduced stocking while range development takes place, and (3) some non-use for personal convenience of the permittees (Table II-17). While the existing permit obligation is 20 percent greater than the carrying capacity Forest-wide, the actual use being made of the range is within six percent of the carrying capacity. It varies from allotment to allotment, but the actual use is getting closer to the grazing capacity. This is accomplished by adjusting numbers and season of use, and by installing improvements and grazing management systems that increase capacity.

In 1980, there were 482 valid livestock permits issued on the Forest. Of this 329 were cattle, and 153 were sheep permits (Table II-18). Forty-seven percent of the cattle permits were for less than 30 animals and 82 percent of the sheep permits were for less than 1,000 head. This large number of permittees, with relatively small numbers of animals, creates a heavy impact on administering the range program on the Forest. There are many changes in permits with an average of about 75 permit waivers and modifications each year.

TABLE II-17

PRESENT AND POTENTIAL RANGE USE

	Present Obligation AUM's*	Actually Grazed AUM's*	Present Capacity AUM's**	Estimated Potential AUM's***
Total AUM's	175,334	151,686	142,249	162,132

* Data From 1980 Grazing Report

** Based on Best Estimate at This Time (1984)

*** Estimated Potential Capacity Based on Current Direction

The range carrying capacity must be balanced so the long-term soil productivity is not impaired. Range carrying capacities can change based on the kind and amount of available moisture, the quality and effectiveness of the allotment grazing system, the level of improvement and maintenance work done, the influence of many natural factors such as catastrophic events (landslides, wildfires), cycle of changes in rodents, pests, diseases, etc., and the impacts from other resource uses and activities on an area.

To keep use levels in balance with the range, additional improvement work is needed on many of the allotments on the Forest. Some allotments contain poor condition range, lack available water, or need both structural and non-structural improvements to improve and maintain their condition. Some allotments are over-obligated in terms of livestock use to available forage supply. Without range improvement, the obligation will eventually be reduced. Likewise, when improvements in range condition and carrying capacity occur, increase in livestock stocking can be considered.

TABLE II-18

NUMBER OF LIVESTOCK PERMITTEES
ON THE MANTI-LASAL NATIONAL FOREST

Permit Size	Manti Division No. of Permits	LaSal Division No. of Permits	Total	Percent
Cattle 1-30	140	13	153	47
31-50	68	1	69	21
51-100	50	4	54	16
101-300	29	15	44	13
301+	1	8	9	3
Subtotal	288	41	329	100
Sheep 1-30	7		7	5
51-100	10		10	6
101-300	30		30	20
301-1,000	78		78	51
1,000+	28		28	18
Subtotal	153		153	100
Total	441	41	482	---

The inventory (Table II-16) shows sixteen percent of the suitable livestock range on the Forest is in poor condition, 69 percent is in fair condition, and 12 percent is in good condition. Range trend on suitable range on the Forest shows that five percent of the total suitable range is in a up-trend, 80 percent is in a stable condition, and 14 percent is in a down-trend. Range condition and trend need to be improved. Some of these figures are 20 years old. A more current inventory would show a somewhat better range condition.

The greatest potential for improving range conditions and trend is on the poor condition range sites in the high elevation grass-forb, aspen, mountain brush, sagebrush, and pinyon-juniper vegetative types. Approximately 123,000 acres of poor condition rangelands suitable for livestock grazing have been identified on the Forest. Most of these lands will need either treatment or less grazing pressure to improve their condition and trend.

Plant competition has changed in many of the plant and habitat types on the Forest. Many of the original, more desirable species are missing. Lower elevation sites in the sagebrush-grass and the grass-forb types on the high plateaus were heavily grazed near the turn of the century with resultant much soil loss. These lands have lost much of their productivity and cannot support the quality and quantity of vegetation previously found there. The species found in many of these types today are classed as secondary or invader species, providing less ground cover and available forage. These poor range sites could take a long time to recover and reach their potential because of the slow rate of soil development.

Many range revegetation projects have been completed on the Forest to improve the vegetative and soil conditions. There is a potential for many projects on the Forest. The current range management direction on the Forest is to develop range allotment plans for all grazing allotments by 1988, and to include in these plans the projects needed to develop and improve the range condition. These projects will benefit both livestock and wildlife. As of 1984, 91 of the 144 grazing allotments have plans written and approved.

Many local ranchers are dependent upon the forage produced on the Forest for an important part of their operation. Grazing on National Forest System lands aids in maintaining a stronger tax base and provides support to the local economy and communities.

The conflicts between livestock and big-game use on big-game winter range are minor at present. Conflicts may increase in the future as private lands near the Forest are sold for development. This will reduce the available big-game winter range areas off Forest and increase the use on National Forest System lands.

Conflicts between livestock use and exploration and development of the mineral industry, currently minimal, have a potential to increase with increased mineral activities. Rangelands will be either lost or impacted. Without adequate mitigations, some adjustment in livestock numbers may be needed. It may also be necessary to make changes in management systems and plans to adjust to the effects of these developments.

Timber

LAND CLASSIFICATION

Some 368,100 acres are classified as tentatively suited for timber production on the Manti-LaSal National Forest (Table II-19). This classification was determined in accord with regulations in 36 CFR 219.14. The suited land acreage for timber production is based on total National Forest System lands included in the 1964 timber inventory. These lands were evaluated on slopes, access, and land stability to determine lands tentatively suitable for timber production. Tentatively suited lands include lands that could be harvested using available logging systems without causing irreversible or irretrievable environmental damage. Owing to demand and limitations on logging equipment locally, a second evaluation was made to show the lands suitable for logging with methods commonly used on the Forest (see Table II-20). While 92 percent of the timberland is suitable for timber management, currently only 34 percent of the timberland is available for harvest.

TABLE II-19
TIMBERLAND CLASSIFICATION

	<u>M Acres</u>	<u>Percent</u>
I. Non-Forest Land	644.7	48.3
II. Forest Land	(689.8)	(51.7)
A. Forest Land not Suited for Timber Production	(321.7)	(24.1)
1. Land not capable of producing 20 cubic feet/acre/year.	252.6	18.9
2. Land withdrawn from timber production.	9.4	.7
3. Land not physically suited (irreversible damage likely to occur.)	22.6	1.7
4. Land with inadequate current information.	37.1	2.8
B. Tentatively Suited Forest Land	(368.1)	(27.6)
1. Land not suited for timber production due to high logging costs.	235.4	17.7
2. Net land suited for timber production.	<u>132.7</u>	<u>9.9</u>
III. Total Land	1,334.5	100.0

TABLE II-20

SUITABLE TIMBERLAND CLASSIFICATION BY TIMBER TYPE

Timber Type	M Acres			MBF			
	Total	Tent.	Curr.	Current Allowable Sale Quantity		Optimum LTSY Projected	
				Tent.	Curr.	Tent.	Curr.
PP	105.6	101.9	51.4	3,566	1,799	22,418	11,308
ES	74.1	66.4	24.7	6,640	2,470	13,208	4,940
AF	36.8	33.1	3.4	1,754	180	6,620	680
DF	31.4	28.3	12.8	1,358	614	5,660	2,560
AS	154.6	138.2	44.6	6,081	1,962	20,730	6,690
Total	402.5	368.1	136.9	19,399	7,025	68,708	26,178

Tent. = Tentatively

Curr. = Currently

REGULATION OF CUT

The Forest is now overbalanced in favor of old-growth sawtimber. The percentage of total stocking by size-class follows:

<u>Size Class</u>	<u>Acres</u>	<u>Percent</u>
Mature Sawtimber	95,500	72
Immature Sawtimber and Poles	33,200	25
Seedlings-Saplings and Nonstocked	<u>4,000</u>	3
TOTAL	132,700	

The current allowable sale quantity (ASQ) and projected optimum long-term sustained yield are shown in Table II-20 by species. The ASQ is calculated using the volume production per acre by species developed for the 1966 Forest Timber Management Plans. The LTSY is based on optimizing management for timber growth for each species.

A regulated forest would have approximately 40-50 percent of its commercial forest land in the sawtimber class, 25-35 percent in the pole class, and 25-30 percent in the seedling-sapling class.

EXISTING SITUATION

Of the Forest's 105,600 acres of ponderosa pine, about 25,500 acres are rated as having high to medium susceptibility to attack by mountain pine beetle. About 80 percent of the Engelmann spruce type was affected to some degree by the bark beetle attack in the early 1960's. The remaining 20 percent is rated as having medium to high susceptibility. Root rots are continuing to cause quite

high mortality rates in fir types. About 33 percent of the ponderosa pine type is infected with dwarf mistletoe. An infection of spruce budworm was recently noted in the Engelmann spruce in the Huntington Canyon area.

The price of timber over the last 10 years has been very erratic. The current high interest rate has severely depressed the lumber market. Costs for road construction, logging, and milling have caused most timber sales to be below cost sales.

Most timber sales are on relatively flat slopes with a very few reaching or exceeding 40 percent slopes. Tractor logging is the only yarding method currently used.

Cutting practices have changed over the years. Until about 1960, approximately 25 percent of the spruce fir areas were harvested by clearcuts. Currently, all merchantable timber is salvaged in insect infected or fire killed trees. Growing public sentiment against clearcutting prompted the use of other harvest methods in healthy spruce-fir stands. Ponderosa pine has always been harvested by individual or group selection or shelterwood methods. Clearcutting is still the harvest method for aspen as it is necessary to cut an entire clone at one time to achieve successful sprouting and regeneration of the species.

The present harvest is:

- 2 MMBF Spruce Fir Type
- 2 MMBF Ponderosa Pine Type
- 4.3 MMBF Roundwood Products and Fuelwood, All Species
- Minor harvesting in the Aspen Type
- 8.3 MMBF (Total)

DEMAND ANALYSIS

Demand for sawtimber on the Manti-LaSal National Forest is assumed to be completely elastic. This infers that the quantity offered for sale does not affect stumpage prices and all timber offered for sale will be sold. Average annual production for the past 3 years has been 8.3 MMBF. This figure includes sawtimber, roundwood, and fuelwood.

Fuelwood is being managed under an interim fuelwood management plan until fuelwood management is incorporated as part of the Forest Plan. A charge system for fuelwood for personal use was implemented in 1982. Fees collected through this program are used to maintain the fuelwood management program.

In 1982, 8,500 cords of fuelwood were harvested. Consumption is predicted to increase approximately five percent annually through the planning period to as much as 44,500 cords per year by 2030.

Water

The Forest contributes water to three major rivers: (1) the Upper Colorado River, (2) the Sevier River, and (3) the Jordon River, tributary to the Great Salt Lake. Within these three major drainages, 19 separate watersheds have been identified on the Forest.

Current Use and Management - The Forest receives about 2,640,000 acre-feet of precipitation of which about 731,000 acre-feet is yielded as streamflow. The rest is lost to evapo-transpiration, and groundwater losses. Precipitation varies from 10 to nearly 35 inches per year. (Figures II-3 and II-4

FIGURE II-3

AVERAGE MONTHLY PRECIPITATION

ORANGE OLSEN RANGER STATION

1969 — 1978

AVERAGE ANNUAL PRECIPITATION = 13.97 Inches

ELEVATION = 7,240 Feet

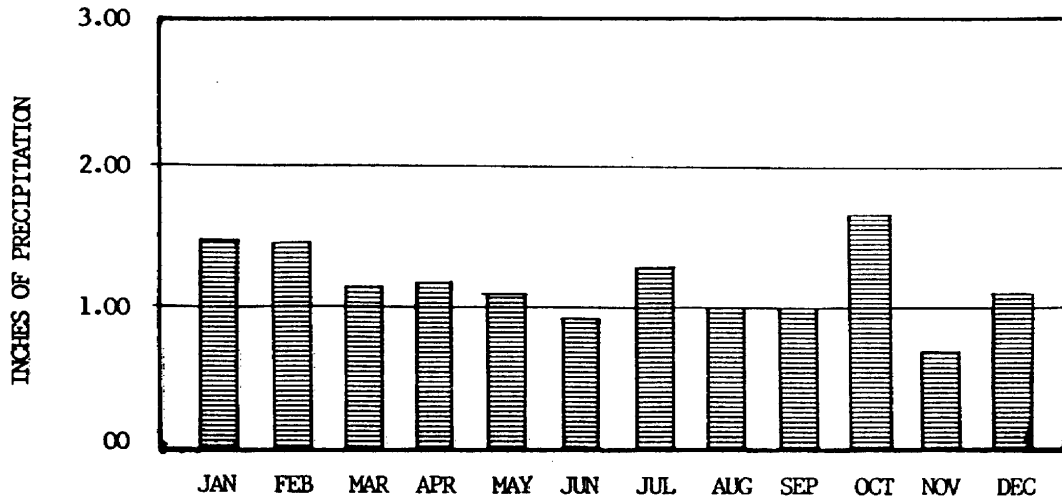


FIGURE II-4

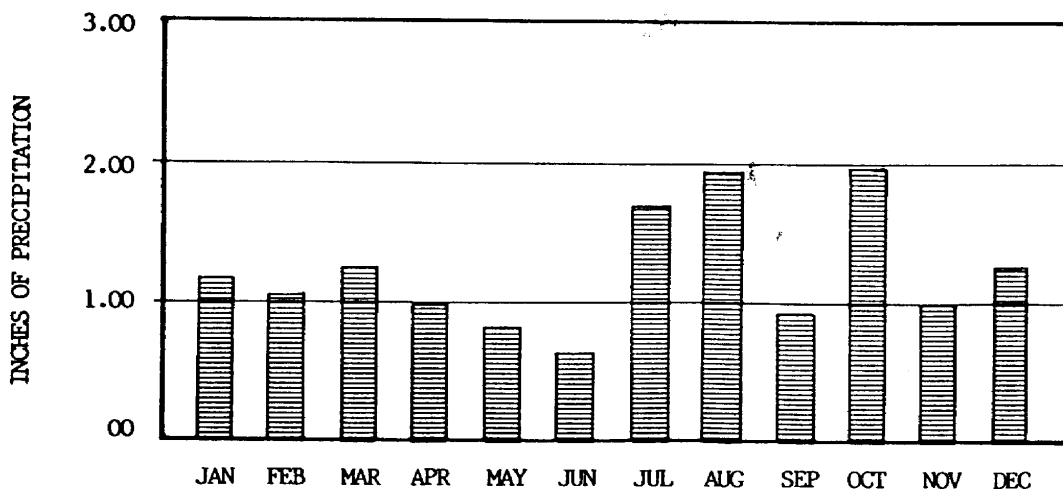
AVERAGE MONTHLY PRECIPITATION

MONTICELLO, UTAH

1906 — 1975

AVERAGE ANNUAL PRECIPITATION = 15.22 Inches

ELEVATION = 7,050 Feet



show the distribution of precipitation through the year at Orange Olsen Guard Station and Monticello, Utah). Water yield throughout the Forest ranges from less than 1 to nearly 19 inches per year. Table II-21 lists the mean annual water yield by watershed. The bottom of the table summarizes the water yield into the major river basins. Thirty-one percent of the high runoff (12 inches or more) occurs on less than 15 percent of the Forest. Forty percent of the Forest produces little runoff (4 inches or less).

Streamflow follows a general pattern influenced by precipitation and typography. The streams rise in the spring as snowmelt progresses up the mountains. The high country includes extensive areas at relatively the same elevation which melts at the same time. Peak flows generally occur between mid-May and mid-June. The streams recede with only temporary increases from summer storms until the fall storms. The storms bring the streams up slightly, but then flows continue to recede as the precipitation turns to snow with little additions to streamflow. The flows continue to recede as groundwater supplies are diminished through the winter.

TABLE II-21 MEAN ANNUAL WATER YIELD BY WATERSHED

Watershed Name	Watershed Number	Mean Annual Water Yield (Acre-Feet)
Upper Spanish Fork	01	41,171
Price River	02	58,641
San Pitch River	03	151,681
Huntington Creek	04	76,309
Straight Canyon	05	69,666
Ferron Creek	06	56,980
Muddy Creek	07	37,284
Moab	08	41,099
Dolores	09	19,038
Indian Creek	10	29,246
Dark Canyon	11	46,807
San Juan	12	36,290
Montezuma	13	9,292
Salt Creek	14	9,188
Fountain Green	15	6,714
Chicken Creek	16	25,608
Upper Salina Creek	17	3,986
Paradox	18	10,866
Grand Gulch	19	<u>1,132</u>
Total		730,998
SUMMARY		
Great Basin	01, 03, 14, 15, 16, 17	238,348
Sevier River	03, 15, 16, 17	(187,989)
Jordan River	01, 14	(50,359)
Upper Colorado	02, 04, 05, 06, 07, 08 09, 10, 11, 12, 13, 18, 19	<u>492,650</u>
Total		730,998

Water flows off the Forest through an estimated 13,600 miles of channels. These channels include the first and second order headwater channels which are nearly all intermittent. About 2,500 miles of channel are third order and larger, with only a portion of these considered perennial. About 680 miles of stream channels are recognized as perennial streams and as fisheries.

An inventory of lakes and reservoirs is given in Table II-22. Most of these are used to store snowmelt and supply irrigation water. However, a few large reservoirs are used to store most of the runoff and provide a nearly constant release of water for industrial and municipal use.

Numerous water collection, storage, and distribution systems exist within the Forest boundaries. Some hydroelectric development has occurred and additional interest in water as a source of power has been expressed. Requests for future water developments will be processed according to State water law and the Forest Service special-use authorization process, and will protect water needed for National Forest purposes.

Water from the Forest supplies all or a portion of the water used by 23 local communities. Table II-23 provides some additional information about the communities and the municipal watersheds. About 39 percent of the Forest provides municipal water. Management is concerned about the health and safety of the people who drink waters from the Forest. These concerns include both the quality and quantity of the water supply.

Existing uses of water are being inventoried, quantified, and filed in accordance with State Law and in keeping with the State's program of stream adjudications. There are some legal questions which must be resolved, but the program of inventory and claims brings questions to the proper area for resolution. (See Tables II-24 and II-25).

Water yield changes are theoretically possible from snowpack manipulations, vegetative manipulations, and topographic changes such as contour furrowing and trenching. Generally, clearcut harvest of conifer or aspen tend to maintain or slightly enhance water production, but might also create land instability problems.

Three reports describe water quality on the Forest. A report for Straight Canyon by McLaughlin in 1973 shows that water is within State standards except occasionally coliform bacteria amounts are exceeded in select spots above Joes Valley Reservoir. A report by Kelly in 1980 shows that water on the Monticello District is within State standards except where natural occurring concentrations of copper occur in the Montezuma drainage. A third report by Kelly in 1983 summarizes data for 15 drainages throughout the Forest and shows that the water leaving the National Forest is generally within State standards.

Riparian areas on the Forest were identified on the basis of stream type. This stream type classification meets the requirements of Executive Order 11990 on wetlands. Presently, individual projects that occur in these riparian areas incorporate specific protection and management measures as reflected in Management Unit Requirement RPN in Chapter III of the Forest Plan.

The riparian and aquatic areas identified in the stream type classification process are the flood-prone areas of the Forest, covered in Executive Order 11988, Floodplain Management.

Demand Trends - The growing population and agricultural industries located on lands surrounding the Forest and, to some extent, the lower Colorado River, place heavy demands on available water supplies. Streams in the Forest are over-appropriated; that is, there are more water rights than water available to fulfill them.

Depth Lake Name	Section	Township	Range	Elevation	Surface	Depth	Flux
					Area	Max.	
Joes Valley Reservoir	5 & 6	11S	19W	7,960	0.0	16	3.3
Twin Lake	32	18S	3E	8,038	3.7	15	1.6
Smiths Reservoir	7	48N	2E	8,265	57.3	64	9.8
Manti Comm-Yearns	13	19S	3E	8,378	2.0	20	0.0
Buckeye Reservoir	2	14S	3E	8,422	160.1		4.0
Town Reservoir	20	19S	4E	8,443	3.9		3.3
Hamburger Lake	28	18S	6E	8,465	476.0	4	3.3
New Field Reservoir	20	17S	22E	8,618	0.0	4	1.6
Patten Reservoir	22	13S	6E	8,618	12.1	21	3.3
Lake Hill Reservoir	20	33S	22E	8,665	2.0	13	1.6
Gooseberry Reservoir	7	15S	6E	8,684	2.2	6	7.2
Spring Lake	21	33S	5E	8,738	6.2	11	1.6
Millers Flat Reservoir	3	14S	20E	8,743	9.1	15	0.0
Monticello Lake	23	18S	22E	8,746	5.4	15	0.7
Electric Lake	14	34S	5E	8,770	4.4		6.6
Slide Lake	3	33S	6E	8,793	5.4	10	0.0
Duck Lake	19	17S	5E	8,795	105.0		2.6
Racetrack Pond	22	13S	5E	8,798	2.5		3.3
Soup Bowl	32	18S	24E	8,810	49.9	16	1.6
Boulger Reservoir	33	18S	5E	8,838	0.0	36	0.0
Grassy Flat Reservoir	4	26S	6E	8,841	11.9	19	0.0
Academy Mill Reservoir	4	18S	6E	8,845	32.4		13.1
Oowah Lake	33	14S	6E	8,861	8.2		0.0
Marys Lake	14	13S	4E	8,870	0.0	19	1.6
Cleveland Reservoir	27	14S	5E	8,897	7.0		3.3
Beaver Dams Reservoir	30	27S	4E	8,920	11.1	11	0.0
Rolfson Reservoir	33	18S	6E	8,920	12.1	18	27.9
New Canyon Reservoir	3	20S	3E	8,936	8.2		0.0
Petes Hole Reservoir	5	20S	6E	8,938	7.7	28	3.3
Julius Flat Reservoir	27	19S	5E	8,957	0.0		3.3
Wiggly Spring Reservoir	7	13S	3E	8,958	137.9	8	0.0
Lower Six Mile Pond	2	17S	6E	8,975	0.0	20	0.0
MIA Camp Lake	21	19S	6E	9,012	1.7		1.6
Grassy Lake	26	16S	5E	9,220	4.4		4.9
Upper Six Mile Pond	2	16S	5E	9,250	3.0	8	1.6
Potters Pond West No. 2	8	13S	3E	9,307	46.9		1.6
Potters Pond East	8	14S	5E	9,310	4.2		1.6
Fairview Lakes	36	19S	3E	9,311	4.9	15	1.6
Huntington Reservoir	21	17S	3E	9,348	2.0	7	0.0
WPA Pond No. 2	36	19S	4E	9,348	7.7	8	0.7
Blue-Jewkes	23	19S	4E	9,358	2.7		3.3
Deep Lake	36	19S	24E	9,409	4.4	10	3.3
WPA Pond No. 1	36	18S	24E	9,416	12.8	30	1.6
Duck Fork Reservoir	10	26S	3E	9,416	3.0	11	0.0
Cove Lake	25	26S	4E	9,433	57.1	4	0.0
Warner Lake	28	20S	4E	9,448	2.7		6.6
Clarks	34	19S	4E	9,472	4.4		0.0
Woods Lake	15	19S	4E	9,478	0.0	26	1.0
Upper Rush Pond	24	19S	4E	9,478	24.0		3.3
Lower Rush Pond	24	19S	4E	9,613	9.6	5	1.6
Emery Reservoir	4	19S	4E	9,640	0.0	16	3.3
Lower Horse Creek Pond	24	19S	4E	9,997	2.0	23	1.0
Ferron Reservoir	22	19S	5E	10,012	3.9	33	6.6
Lower Harmonica Lake	13	19S	4E	10,017	7.2	26	1.6
Upper Harmonica Lake	13	19S	4E	10,097	7.2	25	9.8
Spinners Reservoir	2	18S	24E	10,130	2.0	22	3.3
Willow Lake	29	20S	25E	10,132	30.4	2	1.6
Loggers Fork Reservoir	10	27S	4E	10,147	11.9	21	
Henningson Reservoir	20	27S	4E	10,192	7.2	5	
Medicine Lake	35	18S	4E	10,261	28.2	0.0	
Blue Lake	7	20S	4E	10,303	4.9	8.2	
Snow Lake	15	20S	4E	10,319	160	3.3	
Emerald Lake	17	18S	4E	10,394	38	1.6	
Slide Lake	32	20S	4E	1,170.5	10	11.5	
Jet Fox Reservoir	15	17S	4E	9.1	16	1.6	
Blue Lake	20	20S	6,988	21.0		0.0	
John August Lake	35	20S	7,198	5.4	28	0.0	
Island Lake	18	6E	7,198	65.0		0.0	
Middle - 3 Lakes	31	3E	7,502	6.4		1.6	
	18S	5E	7,598	0.0		3.3	
	19S	3E	7,743	0.0	10	0.7	

TABLE II-23

LOCAL COMMUNITIES SUPPLIED BY WATER
FROM THE MANTI-LASAL NATIONAL FOREST

Watershed Source	Portion of Watershed Providing Municipal Supplies		Municipalities Served	Population Served	Subwatershed
02 Price River	76%	95 mi ²	Helper Kenilworth Wellington Price Spring Glen	3,710 500 1,410 9,400 545	Fish Creek Price River Price River Water District Scofield Reservoir Price City
03 San Pitch River	18%	48 mi ²	Ephraim Manti Sterling Spring City	2,803 2,088 300 676	Ephraim Canyon Manti Canyon Sterling Spring Oak Creek
04 Huntington Creek	100%	198 mi ²	Cleveland Elmo Huntington Lawrence	684 342 2,622 100	Rilda Canyon Rilda Canyon Little Bear Canyon Big Bear Springs Huntington Creek Tie Fork Rilda Canyon
05 Straight Canyon	100%	205 mi ²	Castle Dale Orangeville	2,052 1,140	Straight Canyon Straight Canyon
06 Ferron Canyon	79%	142 mi ²	Clawson Ferron	100 1,173	Ferron Community System Millsite Reservoir
07 Muddy Creek		132 mi ²	Moore	342	Muddy Creek
10 Indian Creek	1%	2 mi ²	Blanding	3,787	Head of Indian Canyon
12 San Juan River	10.8%	22 1/2 mi ²	Blanding	3,787	Head of Johnson Creek Recapture Creek
13 Montezuma Creek	12%	5 1/2 mi ²	Monticello	2,575	North Creek - South Creek
15 Fountain Green	7%	2 mi ²	Wales	153	Wales Spring
16 Chicken Creek	53%	4 mi ²	Levan	450	Chicken Valley
18 Paradox Creek	1%	0.6 mi ²	LaSal	200	Coyote Spring

Total Area = 852.6 mi²
Total Area of National Forest = 2,203.9 mi²

$$\frac{852.6}{2,203.9} \times 100 = 39\%$$

COUNT OF WATER USE BY CATEGORIES, MANTI-LASAL NATIONAL FOREST (10)
(AS OF 1980)

IL-49

Watershed Number (AD)	Uses						Rights					
	Livestock	Recreation	Administrative	Wildlife	Other	Total	Beneficial Uses	Appropriative Filed	Certified	Reserved	Decreed	Filed
001	188	1	0	0	0	189	0	5	6	0	0	145
002	217	2	2	0	1	222	0	6	6	2	0	193
003	583	15	2	0	1	601	0	2	3	3	0	0
004	367	3	2	0	0	372	0	5	5	2	1	371
005	692	1	1	0	6	700	1	4	4	6	0	697
006	719	4	0	0	2	725	0	5	7	0	0	28
007	250	2	0	0	0	252	0	0	0	0	0	0
008	218	5	1	0	0	224	0	0	0	3	0	0
009	34	0	0	0	0	34	0	0	0	1	0	0
010	100	2	0	0	0	102	0	0	0	0	0	0
011	109	1	1	0	0	111	0	0	0	1	0	0
012	118	4	1	5	1	129	0	0	0	2	0	0
013	55	10	0	2	0	67	0	2	0	0	0	2
014	4	0	0	0	0	4	0	0	0	0	0	4
015	24	1	0	0	0	25	0	0	0	0	0	24
016	48	1	1	0	0	50	0	0	0	1	0	49
018	208	7	3	1	0	219	0	0	1	3	0	0
019	5	0	0	0	0	5	0	0	0	0	0	0
Totals	3,940	59	14	8	11	4,032	1	29	32	24	1	1,514

Rights		Uses										
Watershed	Appropriative	Beneficial										
Number	Livestock	Recreation	Administrative	Wildlife	Other	Total	Uses	Filed				
Certified	Reserved	Decree	Filed (AJ)									
001	32.2	0.0	0.0	0.0	0.0	32.2	0.0	2.1	2.2	0.0	0.0	25.8
002	92.5	8.9	3.6	0.0	1.3	106.3	0.0	11.6	11.6	1.9	0.0	75.1
003		2.8	1.0	0.0	.1	91.0	0.0	1.3	1.7	1.1	0.0	0.0
004	87.1	1.9	.5	0.0	0.0	49.3	0.0	2.4	2.4	.5	.5	49.2
005	46.9	.3	2.2	0.0	1,886	3,454	.3	1,884	1,884	11.6	0.0	
006	1,565	3.0	0.0	0.0	.5	.3		.4	.4			3,453
007	.3				.2	109.9		3.2	3.3			.8
008	106.7	0.0	0.0	0.0			0.0			0.0	0.0	45.1
009	26.7	6.4	.1	0.0	0.0	26.7	0.0	0.0	0.0			
010					0.0	592.2	0.0	0.0	0.0	1.4	0.0	0.0
011	585.7	0.0	0.0	0.0	0.0	48.9	0.0	0.0	0.0	.2	0.0	0.0
012	48.9	0.0	0.0	0.0	0.0	11.6	0.0	0.0	0.0	0.0	0.0	0.0
013	11.6	0.0	.5	0.0	0.0	63.8	0.0	0.0	0.0	.5	0.0	0.0
014	63.3	1.5	.3	.5	.1	26.0	0.0	0.0	0.0	.4	0.0	0.0
015	23.6	6.6	0.0	.2	0.0	17.6	0.0	.3	0.0	0.0	0.0	0.0
016	10.8	0.0	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	.3
017	2.8	.1	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	2.8
018		.8	.1	0.0			0.0			.1	0.0	2.7
019	2.7	0.0	8.8	.1	0.0	9.7	0.0	0.0	0.0	8.8	0.0	9.6
					0.0	1,120		0.0	7.8			0.0
	8.8	0.0	0.0	0.0	0.0	.4	0.0	0.0	0.0	0.0	0.0	0.0
						.5						0.0
	1,111											
	.5											
	.5											
Totals	3,830.4		32.3	17.1		. 8	1,888.2	5,768.8		.3	1,905.3	
	1,913.4	26.5	.5	3,667.2								

The demand for water is expected to continue to increase with the projected population increases. This expected increase in demand is greater than the maximum amount of water the Forest can produce and still meet water quality standards.

WATERSHED CONDITION

When the Manti and LaSal National Forests were established, the land was in poor watershed condition. While the condition has improved since time, considerable watershed improvement work is still necessary to bring watersheds up to an acceptable condition. These improvements may include topographic changes to reduce sediment yields and increase vegetative production capabilities of the land. Treatment is recommended in places where erosion and sediment yields are high and where treatment will reduce these processes. Almost every major watershed and every Ranger District have areas that need treatment.

Where watersheds have been treated, springs have been restored; there is tall grass and stands of brush where the lands were barren. These improvements have captured potential flood waters that historically have damaged downstream communities. (The flood disasters of 1983 and 1984 did not originate on treated areas.)

The Wasatch Plateau has been identified as an area that may be suitable for snowfencing to delay runoff and to increase water yield. Historic research is inconclusive on the effectiveness and impacts of snow fencing. Future researchers may wish to investigate the economic and environmental conditions associated with snowpack manipulations on the Plateau.

WATERSHED IMPROVEMENTS MAINTENANCE

Mechanical watershed improvements in the form of contour furrows, trenching, and gully control structures have been installed on over 32,000 acres at a cost of over three million dollars. The purpose of these improvements is to slow water movement and hold the soils in place until vegetation is established that will perform these functions. Without periodic maintenance, these structures can weaken and fail before the vegetation is established so maintenance activities are scheduled and carried out as funding is available.

Minerals

Statutory and regulatory direction separate mineral resources on lands owned by the United States into three categories: locatable, leasable, and saleable.

Less than one percent of the Forest has lands with outstanding and reserved rights or lands which are not available for mineral entry.

LOCATABLE MINERALS

Locatable minerals are subject to exploration and development under the U.S. General Mining Law of 1872 and its amendments. Examples include, but are not limited to, deposits of vanadium, uranium, gold, silver, lead, zinc, and copper. Citizens, and those who have declared their intent to become citizens, have the right to claim, develop, and purchase mineral deposits subject to the U.S. Mining Laws on lands in Federal ownership, including those of National Forest System. Through a memorandum of understanding between the Bureau of Land Management (BLM) USDI, and the Forest Service, USDA, the Forest Service administers most aspects of the U.S. Mining Laws on National Forest System lands. In addition, under the regulations in 36 CFR 228, the Forest Service approves exploration and mining operating plans and administers those operations to ensure protection and reclamation of affected surface resources.

The LaSal Division contains known deposits of uranium/vanadium ores and other metals such as gold, silver, copper, and zinc. Approximately 50,000 mining claims have been staked on the LaSal division, mainly for development of uranium/vanadium, gold, silver and copper. The uranium ore is low grade and local industry cannot compete economically on the world market with the present price of yellow cake below \$20.00/lb. The price has to be in the range of \$25.00/lb. or higher in order for the local industry to compete. With the high cost associated with mining and the low ore grade, exploration and mining activities have been limited in recent years. Considerably fewer claims have been staked on the Manti and San Pitch Divisions. The interest here is generally for development of limestone, decorative stone, or carbonaceous shale (which is suitable as a base material for fertilizer and soil conditioner).

The market for locatable minerals is extremely volatile, especially regarding uranium, vanadium and precious and semi-precious metals. The level of activity and production on the Forest at any given time is controlled by boom and bust cycles in the respective markets.

Within the Forest, 1,237,850 acres are considered available for locatable mineral entry and location. The balance, 96,650 acres, is withdrawn from entry for administrative, recreation, or cultural purposes.

LEASABLE MINERALS

Federally owned leasable minerals include but are not limited to coal, gas, oil, oil shale, geothermal, potassium, sodium carbon dioxide, phosphate and sulfur. Most of these minerals are subject to exploration and development under leases, permits, or licenses granted by the Secretary of the Interior. The major controlling statutes are the Minerals, Leasing Act of 1920 and amendments, the Minerals Leasing Act of Acquired Lands of 1947, the Geothermal Steam Act of 1970, the Federal Coal Leasing Amendments Act of 1975, and the Surface Mining Control and Reclamation Act of 1977. The Secretary of the Interior's authority is administered by the BLM and the Office of Surface Mining (OSM). When National Forest System lands are involved, the BLM/OSM requests the Forest Service to evaluate leases, licenses, permits, and operating plans. If the proposals are acceptable to the Forest Service, appropriate stipulations are formulated and designed to minimize the impacts on other uses and surface resources, and to provide for prompt reclamation or restoration of affected lands upon abandonment of operations.

Prior to approval of operating plans, the Forest Service participates with BLM or OSM in the formulation of the site-specific terms and conditions of operating plans so that the plans provide appropriate mitigation measures to ensure that adverse impacts on surface resources will not exceed applicable environmental protection standards. Plans must be designed to minimize the impacts of operations on other surface resources and to provide for prompt reclamation or restoration of affected lands upon abandonment of operations.

Approximately 85 percent of the lands administered by the Forest are leased for oil and gas. Lands administered by the Forest are available for oil and gas leasing under current management direction, with the exception of 60,000 acres in the Dark Woodenshoe Management Unit, established by Monticello Land Use Plan (MLUP) approved in 1976. Eight other management units established by the Ferron-Price Land Management Plan, approved in 1979, are available for leasing, but surface occupancy is prohibited.

There are 4 gas fields on the Forest, all on the Manti Division. Only one field, the Clear Creek Field, is in production. Existing wells in the other fields, the Gordon Creek, Joe's Valley, and Flat Canyon Fields, are played out or shut-in for future production. The San Pitch Division and western portion of the Manti Division lie along the eastern margin of a geologic structure known as the "Western Overthrust Belt" which has recently yielded significant discoveries and production of oil

and gas reserves. The entire Forest has been affected by the intense interest in oil and gas exploration and development generated by recent discoveries. The Manti Division contains approximately 1,600 oil and gas leases. The estimated oil and gas resources below the Known Geologic Structures (KGS) or the rest of the Forest have not been released by private industry.

The Wasatch Plateau Coal Field, as delineated by the Department of Interior in their letter to the Forest, dated January 24, 1983, contains 445,100 acres of medium or high potential coal lands on the Manti Division of the Forest. The Manti Division encompasses a majority of the Wasatch Plateau Coal Field and has vast reserves of high quality mineable coal. Approximately 60 percent of the total coal produced in the State of Utah in 1981 (13.3 million tons) was mined from the Manti Division (8.0 million tons). The coal was produced from a total of 9 mines. At that time, there were 50 existing leases on the Forest that encompassed approximately 41,900 acres. This leased land may contain upwards of 1,000,000,000 tons of coal. Considering today's market, local coal mined underground is valued between \$22 and \$25 per ton. The Federal government receives \$1.74 for each ton of coal mined. The public interest for the high BTU-low sulfur coal found on the Manti Division is high.

The coal lease moratorium imposed by the Department of Interior in 1971 was lifted in 1979 by the establishment of a new program directed at the improved management of Federally-owned coal. This created the need to apply the unsuitability criteria to all lands which may be capable of coal production as part of this planning effort.

The first round of coal leasing effort in 1981 under the new coal leasing program resulted in leasing of 3 new coal tracts consisting of a total area of 2,926 acres on National Forest System lands.

Though the present coal market is depressed, eight potential coal lease tracts comprising nearly 37,300 acres were evaluated in the second round of leasing. They contain almost 730 million tons of inplace coal.

SALEABLE (COMMON VARIETY) MINERALS

Common variety minerals have been developed throughout the Forest. They are generally low value deposits of sand, gravel, clay, and stone. The greatest demand is for the development of gravel sources for road construction and improvements in support of mineral activities. Within the Forest, at least 1,237,850 acres are available for the production of common variety minerals.

Support Service Elements

Fire

CURRENT USES AND MANAGEMENT

Wildfires have periodically burned areas of the Forest. These fires have affected the type, composition, age, quality, and growth rate of the various vegetation types. On an average, 51 fires burn a total of 105 acres annually on the Forest. Approximately five percent of the fires are human caused. Human caused fires are expected to increase with population growth and proportionate increases in Forest visitor use. Table II-26 summarizes the fire statistics for the Forest.

The current fire management program is based on resource protection from fire through presuppression, prevention, and fuel treatment. The overall fire management objective is to provide a cost-effective program which responds to land and resource management goals and objectives. Presently, the wildfire suppression objective is to confine or control all wildfires so that land management objectives can be met at a reasonable cost.

Fuel treatment to reduce fire hazard has been largely accomplished by removal of dead and down material for fuelwood, slash cleanup of timber sales and Timber Stand Improvement (TSI) activities, and prescribed burning. From 1978 to 1984 the Forest has averaged 350 acres of slash and cleanup annually.

TABLE II-26

**FIRE STATISTICS
(1971-1979)
NUMBER OF FIRES**

Year	Human Caused	Lightening	Class* A&B	Class** C+	Class Total	Acres Burned
1971	7	42	47	2	49	273
1972	10	38	48	0	48	25
1973	9	36	44	1	45	36
1974	12	48	59	1	60	93
1975	10	26	36	0	36	13
1976	8	66	70	4	74	145
1977	8	53	60	1	61	65
1978	12	26	36	2	38	239
1979	22	25	46	1	47	56
Total	98	360	446	12	458	945
Average	11	40	50	1	51	105

*Class A = Less than 1/4 acres.

*Class B = 1/4 acres to 10 acres.

**Class C+ = 10 acres or greater.

Law Enforcement

The Forest Service is responsible for enforcing Federal laws and regulations on the National Forest. This responsibility cannot be delegated to other agencies or local law enforcement entities although the Forest Service may cooperate with State and local agencies in enforcing certain State laws on National Forest System lands. The Sisk Act provides statutory authority to reimburse local and State law enforcement agencies for protection of persons using National Forest System lands and property. Agreements are in effect with Sanpete, Emery, and San Juan Counties.

The Forest has identified the following law enforcement concerns:

1. Detailed records have not been maintained for all violations. This has prevented an accurate determination of the Forest law enforcement problems. Loss of signs, facilities, fuelwood, and equipment is believed to be substantially more than reported.
2. Theft and vandalism to archeological sites is occurring.
3. Damage to resources is resulting from vehicular travel activities, particularly during hunting season and because of encroachment into areas closed to vehicular travel.
4. A lack of adequate facilities to handle the large number of people who visit the Forest at peak periods leads to violations.
5. Encroachment sometimes occurs on National Forest System lands by adjoining landowners. Months or even years can elapse before violations are discovered and investigated. Several old cases have not yet been resolved.
6. Select timber, fuelwood, and grazing unauthorized use is occurring.
7. Most employees assigned to recreation and fire prevention receive law enforcement training. This training is not adequate to handle many of the law violations they encounter. In addition, threats, intimidations, and assaults on Forest officers are expected to increase, particularly to those responsible for compliance checking and fee collection. Lack of highly trained and experienced employees is expected to be a continuing problem.

Forest Pest Management

Forest insects and disease can have a direct and very significant impact on many of the Forest's resources. Insects and disease have caused widespread damage to the timber resource. They have also impacted and caused losses in forage production on many reseeded range sites.

Two insects, the mountain pine beetle (*Dendroctonus ponderosae*) and the Engelmann spruce beetle (*Dendroctonus rufipennis*), are of the most concern to the Forest timber resource.

Other insects that have caused problems on the Forest are: aspen leaf miner (*Phyllocnistis populiella*), roundheaded pine beetle (*Dendroctonus adjunctus*), Douglas-fir beetle (*Dendroctonus pseudotsugae*), Mormon crickets (*Anabrus simplex*), grasshoppers (*Melanoplus spp.*), and black grass bugs (*Labops hesperius*).

Any of the above listed insect species can, under the right conditions, cause significant damage and impact on one or several resources. However, with good management practices and continued awareness of population buildups, most of these insects can be controlled or maintained at levels where significant resource damage would not occur.

Insects that have caused range damage on the Forest are the Mormon cricket, Carolina and two striped grasshopper, and black grass bug.

Approximately 15,000 acres located in Twelve Mile Canyon, and on the Wales top were treated with malathion insecticide to control grasshoppers in the early 1970's. Weather conditions during the early 1980's favored grasshopper reproduction with the result that the population is growing and control may again be needed.

Black grass bugs are present in most of the wheat grass seedings on the Forest. They have not been a serious threat to date, but must be monitored to insure that population buildups do not damage these rangelands.

The tree diseases that are the most common are the brown rot (Fomes annosus), white mottled root rot (Fomes applanatus) and shoestring root rot (Armillaria mellea). Root rots cause mortality and growth loss in localized areas. These fungi survive as saprophytes in stumps and pose a threat to any regeneration on infected sites.

Dwarf mistletoe, a semi-parasite, has caused significant losses in both Douglas-fir and ponderosa pine trees on the Forest. A roadside survey conducted on the Forest in 1978 showed that 34 percent of the ponderosa pine sites surveyed were infected. Timber losses continue to increase because dwarf mistletoe intensity increases at an average of one severity class every 15 years. Any natural regeneration on these sites could become infected at an early age and could sustain heavy losses before harvest age.

Air Quality

The entire Forest is designated as air quality Class II.

Air quality over the Forest is believed to be good with respect to air pollutants. The largest source of air pollution from Forest activities is smoke from fires (both wildfires and prescribed fires) and fugitive dust from unpaved Forest Developed Roads.

The Clean Air Act and its 1977 amendments give the States most of the responsibility for managing air quality within their boundaries. The framework for air quality management is the State Implementation Plan. This establishes standards and guidelines which require forest plans to identify significant current potential air pollution emissions from management activities that would cause the ambient air quality to exceed Federal and State ambient air quality standards. It also establishes standards and guidelines relative to incremental changes in air quality in Class I and Class II areas.

The Forest's role in air quality management is to coordinate Forest management activities with State and Federal air quality control efforts. This is accomplished by properly managing Forest management activities such as prescribed fire, construction and use of roads, and the operation of various facilities. Temporary air degradation does occur, but is managed so that air quality standards are not exceeded.

Some air quality problems come from communities and industrial development adjacent to the Forest, especially in Carbon, Emery, and Sanpete Counties. However, the actual potential for long-term degradation of air quality over the Forest is low because potential point sources of air pollution unwind (north and west) of the Forest are legally restrained from creating significant adverse effects upon Forest air quality-related values.

The Forest Service's responsibility under PSD (Prevention of Significant Deterioration) regulations is to protect Class I air quality areas. Two Class I air quality areas are near the Manti-LaSal National Forest including Canyonlands National Park north of the Monticello Ranger District and Arches National Park west of the Moab Ranger District. In both cases, these Parks are normally upwind of the National Forest.

The Forest complies with the State agricultural burning application and permit requirements.

There is concern about potential air quality degradation from wood burning stoves and fireplaces. This also has been a concern to the Forest Service and EPA. Studies are ongoing to determine the extent and significance of impact. Ultimate responsibility for regulations and control belongs with the States of Colorado and Utah.

Lands

LAND USES

National Forest System lands are generally available to occupancy, where such is in the public interest, except where occupancy is specifically prohibited through legislation or administrative decision. Occupancy is authorized through the issuance of special use permits. Nearly 400 special-use permits have been issued for uses ranging from recreation to research to utilities. The demand is increasing for special use permits to occupy National Forest System lands. This demand can likely be attributed to the Forest's mixed landownership pattern and the increasing population.

Applications for special uses are dealt with on a first-come, first-serve basis, except that occupancies providing for a public need receive priority over those meeting private needs. If competition occurs in the application process, a prospectus is issued for bids. Following a bid evaluation, a permit would be issued with the purpose of obtaining the greatest public benefit. The Forest Service discourages special uses that solely benefit private parties, and also discourages uses on parcels which may be involved in land exchanges in the future.

In administering special uses, priority is given to those with health and safety considerations such as water supplies, reservoirs, and public roads.

Prime farmland, rangeland, and forest lands, as defined in the Secretary of Agriculture's Memorandum Number 1827, Supplement 1, do not occur on the Forest. Therefore, no such land use considerations were included in the planning effort.

CORRIDORS

Special uses for powerline, pipeline, and highway rights-of-way are another use of National Forest System lands. Because of its location, there is high demand for rights-of-way across the Manti Division. There are four major powerlines (745 KV) and one pipeline crossing the Forest and four State or Federal highways. There are no corridors.

LANDOWNERSHIP ADJUSTMENT

Landownership within the Forest includes private lands, mineral fractions, and lands owned by other Federal agencies, the State, Counties, and municipalities. Ownership changes occur through land exchange, fee purchase, and - more recently - the use of scenic easements to acquire certain rights short of fee ownership. Exchange activity has been low in the past due to uncertain funding and few proposed exchanges which would benefit the public.

The Small Tracts Act allows for three categories of land: (1) parcels encroached on through sale or exchange, (2) road rights-of-way, and (3) mineral survey fractions. There are very specific limitations for each of the categories.

Occupancy trespass involves the identification, investigation, and resolution of non-mineral related unauthorized occupancy and use of the Forest. There are suspected occupancy trespasses resulting where private landowners have constructed improvements on adjacent National Forest System lands. Where boundary lines are not surveyed, the Forest Service has increased efforts to do so. It is anticipated that ongoing surveys of township and property boundaries will identify more occupancy trespass.

Forest landownership adjustments are coordinated with the plans and programs of other Federal agencies and State and local governments. Both private and government interest in landownership adjustment is expected to increase from the present level.

WITHDRAWALS

A withdrawal is an order removing a specific tract of land from availability for certain uses. Certain lands administered by the Forest Service may be withdrawn from entry and appropriation under various acts of Congress.

Land withdrawals by the Forest Service are made for minerals, power sites, archeological values, recreation sites, and administrative sites. The Bureau of Reclamation has withdrawals for reclamation and the Federal Energy Regulatory commission has withdrawals for power sites. Congressional withdrawals have been made for certain activities with the Dark Canyon Wilderness.

A review and assessment of existing mineral withdrawals is required by Section 204 of the Federal Land Management and Policy Act. Present direction to all Federal agencies is to review land withdrawn from entry under the 1872 Mining Act by 1991, and revoke those which create an unnecessary encumbrance on the land.

RIGHTS-OF-WAY ACQUISITION

Increasing use and development of National Forest System lands has resulted in many problems. One of these problems is access to National Forest System lands for the general public.

Landowners often enjoy nearly exclusive use of public land through control of access. Because of the mixed landownership pattern of the Forest and the lack of fences and signs, the status of rights-of-way (ROW's) for roads and trails is often uncertain.

The current emphasis is to acquire ROW's where problems from lack of access are the greatest and where property owners are willing to grant and sell easements. The right of eminent domain (condemnation) has not been used in the past. It may become necessary when a ROW is in the public interest and the property owner is unwilling to grant it.

SPECIAL AREAS

Currently 4,659 acres of the Forest are designated as special areas.

- The Great Basin Experimental Range (4,608 acres) was established for range and hydrological research.

- The Grove of Aspen Giants is a special scenic area (10 acres) containing some very large ~~an~~ trees.

-The Pinhook Battleground is a historical site (one acres) where a group of Indians battled ranchers that were chasing them.

-The Elk Knoll Research Natural Area (40 acres) was established to preserve and interpret ecological trends in soil and vegetation, under protection of grazing from domestic livestock.

Dispersed recreation is permitted in some special areas. Some motorized use is permitted on designated routes in the Great Basin Experimental Range.

The Department of Interior has identified four National Natural Landmarks on the Forest. They include Fisher Towers - Onion Creek Gorge in Grand County, Manti Canyon slide and Maple Canyon - Box Canyon in Sanpete County, and Mount Peale - Dark Canyon glacial features in San Juan County.

Nelson Mountain, Mount Peale, and Cliff Dwellers Pasture proposed Research Natural Areas (RNA's), and the Scad Valley proposed Botanical Area are additional sites that have been identified for possible formal designation. They will be evaluated by research and administrative personnel in the near future. These areas are described as follows:

1. Nelson Mountain - Approximately 490 acres located in portions of Sections 22, 23, 26, 27, 34, and 35 of T20S, R6E, Salt Lake Meridian (SLM). This area is located in Emery County, Ferron Ranger District. Principal features include vegetative communities of curleaf mountain mahogany woodlands, black sagebrush and mountain big sagebrush. Minor representation of the white fir coniferous forest series is also present.
2. Mount Peale - Approximately 2,380 acres in portions of Sections 11, 12, 13, 14, 15, 22, 23, and 24 of T27S, R24E, SLM. This area is located in San Juan County, Moab Ranger District. Principal features include several types of alpine turf, rock communities, and high-mountain landforms. Minor representation of the subalpine fir coniferous forest series is also present.
3. Cliff Dwellers Pasture - Approximately 265 acres in portions of Sections 22, 23, and 27 of T34S, R21E, SLM. This area is located in San Juan County, Monticello Ranger District. It is a species-rich, sub-irrigated box canyon surrounded by semi-desert habitat. Principal features include birch/bluegrass communities, gambel oak-bigtooth maple woodlands, and slickrock shrub communities.
4. Scad Valley Botanical Area - This area is located in Emery County on the Price Ranger District. It supports a number of disjunct plant species which do not occur elsewhere on the Manti-LaSal National Forest, and which are uncommon in Utah.

Facilities

Forest facilities include Forest Highways, Forest Development Roads and Trails, and buildings such as guard stations, ranger stations, and warehouses. In addition, the Forest is affected by general transportation facilities such as airports and railroads.

GENERAL TRANSPORTATION

Airfields serving the planning area include noncommercial airfields at Blanding, Monticello, Moab, Price, Huntington, Ephraim, Mount Pleasant and Nephi. The area is served by the Denver Rio Grande Western Railroad (D&RGW) line that goes from Denver to Salt Lake City through Price with a station in Helper. The D&RGW has a track line to Scofield serving coal mines in that area,

and a track line to Moab serving the Potash and uranium mines in that area. The D&RGW had a track line in Sanpete Valley that was cut by the Thistle mudslide and has not been restored. Utah Railway has a line serving the coal mines along the east escarpment of the Wasatch Plateau to Huntington and joins the D&RGW at Helper, with a track to Salt Lake City. Several bus lines use the major highways for transit and sightseeing charter services.

HIGHWAYS AND ROADS

Highways - A list of Federal and State highways that provide access to the Forest is found in Table II-27. These routes parallel the Forest boundaries with the exception of the Forest Highways which are important crossing links and internal collectors on the Forest.

Forest Highway 7 (SR 31), the Fairview Huntington Highway connecting Fairview and U.S. Highway 89 on the west with Huntington and State Route 10 on the east, is the only bituminous paved route across the Forest. It carries heavy cross Forest traffic, minerals exploration, development, and production traffic and recreation traffic. This road is at the highest standard of any arterial or collector road on the Forest.

Forest Highway 8 (SR 29), the Orangeville-Ephraim Highway connecting Ephraim and U.S. Highway 89 on the west with Orangeville and State Road 10 on the east, is below standards for a Forest Highway. Some 13.1 miles of the route under county jurisdiction should be upgraded and 11.8 miles under county jurisdiction could be resurfaced.

Forest Highway 45 (SR 96), the Eccles Canyon Highway, connects the Eccles Canyon mining area and Scofield Recreation area with U.S. Highway 6 to the northeast and Fairview and Huntington via Forest Highway 7 to the west. This route is being reconstructed by the State Department of Transportation for Carbon, Emery, and Sanpete Counties, with prepaid sales taxes from mineral development in the area. A two-lane bituminous facility has been approved for the route, and all drainage and grading is complete. This route moves recreation traffic to the Scofield Recreation facilities, moves the work force to the mines, and removes the mineral products from the area.

TABLE II-27

FEDERAL AND STATE HIGHWAYS PROVIDING ACCESS TO THE FOREST

Forest Division	Interstate Highway Number	United States Highway Number	State Routes Number	Forest Highway Numbers**
Manti	70	6 89	10	None
			31	7
			29	8
			96	45
LaSal	None	191	46	None
			128	None
			95	None
			211	None
San Pitch	15	89	28	None
			132	None
			117	None

** Forest Highway number for portion of State Route crossing the National Forest.

The Forest has 1,264.4 miles of inventoried Forest Development Roads, and 112.1 miles of Forest Highways. Most of the Forest Development Roads are local, although 654 miles are arterials and collectors. See Table II-28, II-29, and II-30. Many other Federal, State, and County roads also provide access to the Forest. In addition, there are approximately 1,500 miles of noninventoried roads not included on the Forest Development Roads inventory.

TABLE II-28

<p style="text-align: center;">FOREST DEVELOPMENT ROAD SYSTEM FOREST SERVICE JURISDICTION Classification, Surface/Grading, Maintenance Level (Miles)</p>					
<u>Classification/ Maintenance Level</u>	<u>Subtotal Total</u>	<u>Primitive Undrained</u>	<u>Native Graded Drained</u>	<u>Aggregate Graded Drained</u>	<u>Bituminous Graded Drained</u>
Arterials	36.4			36.4	
1					
2					
3					
4	36.4			36.4	
5					
<hr/>					
Major Collectors	186.7	9.6	119.7	49.4	8.0
1					
2	9.6	9.6			
3	169.9		119.7	49.4	1.0
4	7.2			0.2	7.0
5					
<hr/>					
Minor Collectors	356.7	91.8	246.5	18.4	
1					
2	113.3	78.6	34.7		
3	241.4	13.2	211.8	16.4	
4	2.0			2.0	
5					
<hr/>					
Locals	684.6	483.0	169.1	24.2	8.3
1	3.4	3.4			
2	503.5	478.3	21.6	3.6	
3	167.7	1.3	147.5	18.5	0.4
4	8.9			2.1	6.8
5	1.1				1.1
<hr/>					
Total	1,264.4	584.4	535.3	128.4	16.3
<hr/>					

TABLE II-29

FOREST DEVELOPMENT ROAD SYSTEM
STATE OR COUNTY JURISDICTION
Classification, Surface/Grading, Maintenance Level
(Miles)

<u>Classification/ Maintenance Level</u>	<u>Subtotal Total</u>	<u>Primitive Undrained</u>	<u>Native Graded Drained</u>	<u>Aggregate Graded Drained</u>	<u>Bituminous Graded Drained</u>
Major Collectors	34.7				
1					
2	3.1	3.1			
3	21.2		3.2	17.5	0.5
4	10.4			8.8	1.6
5					
Minor Collectors	22.1				
1					
2	7.9	7.9			
3	13.2		4.5	8.7	
4	1.0			1.0	
5					
Locals	13.7				
1					
2	7.5	7.5			
3	6.2		6.2		
4					
5					
Total	87.7	18.5	13.9	36.7	18.6

TABLE II-30

FOREST HIGHWAY SYSTEM STATE OR COUNTY JURISDICTION Classification, Surface/Grading, Maintenance Level (Miles)					
<u>Classification/ Maintenance Level</u>	<u>Subtotal Total</u>	<u>Primitive Undrained</u>	<u>Native Graded Drained</u>	<u>Aggregate Graded Drained</u>	<u>Bituminous Graded Drained</u>
Arterials					
1					
2					
3	13.1		13.1		
4	11.8			11.8	
5	87.2				87.2
<hr/>					
Total	112.1		13.1	11.8	87.2
<hr/>					

Significant Forest Development Roads - There are four Forest Development Roads receiving a significant amount of use and providing access to major portions of the Forest. They are:

Skyline Drive is a major north-south route that runs the length of the Manti Division. The route runs from U.S. Highway 6 on the north to Interstate 70 on the south via the Fishlake National Forest.

Ferron-Mayfield Road is a major west-east route across the lower portion of the Manti Division between Ferron on State Road 10 and Mayfield on U.S. Highway 89.

The LaSal Loop Road is a scenic and recreation route on the Moab Ranger District.

Miller's Flat Road is a major north-south route connecting Forest Highway 7 on the north to Forest Highway 8. This route services the Miller's Flat Reservoir, Upper Joes Valley, and Joe's Valley recreation areas.

Road Management/Maintenance - About 24 miles of road are constructed, reconstructed, or surfaced annually. Historically, roads constructed for management activities were left open for motorized public use. During the last few years, roads have been closed or restricted to provide nonmotorized recreation opportunities, to reduce disturbances to wildlife, damage to roads and adjoining areas, and maintenance costs.

The current and anticipated maintenance allocations are insufficient to properly maintain the entire inventoried road system without experiencing significant lowering of the current facility standards. During the period 1977 to 1981, 1,138 miles of road were maintained on an annual basis. However, less than one percent were maintained at Level 1; 51 percent at Level 2; 41 percent at Level 3; four percent at Level 4; and less than four percent at Level 5. Level 1 maintenance is the lowest maintenance effort and Level 5 is the highest maintenance effort.

Some roads and trails are maintained by counties, mineral developers, timber purchasers, private landowners, landowner associations, user groups, permittees, and volunteers. The Forest Service coordinates the work of these groups.

The demand for use of Forest Development Roads is significant. Currently, congestion occurs primarily on public roads rather than Forest Development Roads and most often at the beginning and end of weekends. Four-wheel-drive interests want continuing opportunities for vehicular travel and primitive road use. The owners of private inholdings want access to their property. Sightseers want more roads with better driving surfaces. In the immediate future, demand for more and better roads is expected to increase. The biggest demand in the near future is expected to be access for mineral exploration and/or development. There is also a segment of the public that wants fewer roads and more opportunities for nonmotorized recreation.

TRAILS

Current Uses and Management - There are 809 miles of Forest Development Trails on the Forest and an unknown number of miles of noninventoried trails. Visitor control to disperse use more uniformly has not been practiced. Horseback use is permitted on all trails. No trails on the Forest are reserved exclusively for horse use. Most trails are open to vehicular travel use.

Most trails have been constructed in large undeveloped areas where other types of access do not exist. Cross country travel routes that begin to show signs of use have been cleared and managed as trails. Trails have been managed to permit or restrict use according to compatible uses, resource needs along the trail, and the desire of current and potential users.

National Recreation Trails - There are two National Recreation Trails on the Forest. Fish Creek-Skyline Drive National Recreation Trail is ten miles in length.

Left Fork of Huntington Canyon National Recreation Trail is four miles long and runs from Scad Valley near Millers Flat Reservoir to the Left Fork of Huntington Creek Campground.

Significant Trails - The Manti Division contains only one significant trail (other than the National Recreation Trails), which is the Horse Creek-Scad Valley Trail. On the LaSal Division, the significant trails include LaSal Mountain Trans-Mountain, Bachelor Basin (trails), Skyline, Woodenshoe-Dark Canyon, Trail Canyon, Rig Canyon, and Robertson Pasture-Twin Peaks trails.

Trails are maintained on a periodic basis; the frequency is determined by trail use, need for maintenance, and funding. The Forest has not constructed or reconstructed trails in the past five years.

Demand Trends - Projected demand for trails is expected to increase along with the demand for dispersed recreation opportunity.

NON-TRANSPORTATION FACILITIES

The existing administrative site buildings and facilities are considered inadequate to support the Forest program of work because of: (1) safety and health problems, (2) location with respect to anticipated work loads, (3) inadequate capacity for anticipated work loads, or (4) a combination of one, two, and three.

The Forest has 74 buildings. Eleven percent are under 15 years of age and require normal preventative maintenance, 22 percent are from 16 to 35 years of age and require high maintenance or repair to prolong usefulness, and 67 percent are over 36 years old and require excessive maintenance and extensive repair to prolong life of the facility.

Half of the 25 administrative sites require major maintenance, reconstruction, or replacement of water and sanitation facilities in order to adequately serve the public and Forest employees.

The Forest maintains and operates the following administrative sites:

1. Moroni Guard Station
2. Ephraim Administrative Site
3. Ferron Administrative Site
4. Joes Valley (Orange Olsen) Administrative Site
5. Moab Administrative Site
6. Monticello Administrative Site
7. Stuart Guard Station
8. Mammoth Guard Station
9. Lake Guard Station
10. Upper Joes Valley Guard Station
11. Seely Creek Guard Station
12. Mt. Baldy Guard Station
13. Indian Creek Guard Station
14. Warner Guard Station
15. Buckeye Guard Station
16. LaSal Guard Station
17. Gooseberry Guard Station
18. Kigalia Guard Station
19. Castle Dale Administrative Site

An aggressive and adequately financed program is needed to replace unsalvageable facilities with fixed or mobile facilities, recondition or reconstruct salvageable facilities, carry out preventative maintenance on newer facilities, and disposal of unneeded or unsalvageable facilities.

The Forest has a major responsibility for the inspection of special-use dams and electronics sites.

The Forest operates and manages electronic communications sites on Cedar Mountain, Abajo Peak, Bald Mesa, Horseshoe Flat, Monument Peak, Cold Spring, and Sanpete Point. The development at these electronic sites are not adequate to handle current and future needs. Microwave radio telecommunications systems are being installed to improve communications and service and to reduce operating costs.

Response to Issues and Concerns to be Addressed

As issues and concerns were collected, opportunities to resolve them were identified. Additional opportunities were developed as the Interdisciplinary Team proceeded with the analysis. The issues and concerns were grouped by the Forest Interdisciplinary Team into like subjects, and Management Questions were formulated to encompass the problems portrayed by the issues and concerns within each subject. The following is a listing of Management Questions:

QUESTION NO. 1: TO WHAT EXTENT SHOULD LAND MANAGEMENT AND EMPHASIS FOR WILDLIFE AND FISH HABITAT BE CHANGED?

Generally, little change in land management and emphasis is needed, although some specific changes were identified as being appropriate. Through the planning process, three Management Unit Requirements have been prepared to provide emphasis for wildlife and fish habitat management. Previously the distinction was not clearly made as to areas where wildlife management would be emphasized. KWR - Key Big Game Winter Range and GWR - General Big-

Game Winter Range place emphasis on deer and elk use in areas they use every winter or during average winters. Lands were assigned to KWR and GWR emphasis based on a compromise in the wildlife needs and the need for other resource uses. RPN - Riparian provides for enhancement of riparian areas for aquatic and terrestrial habitat as well as a watershed. All riparian areas on the Forest are managed under the RPN prescription.

Transplants of desirable wildlife species will be considered, on suitable habitat, where this use is compatible with the land management emphasis. This allows for reevaluating transplant proposals previously denied in unit plans. Management Direction provides for the evaluation of proposed transplants on a site-specific basis in cooperation with State wildlife management agencies and other interested parties.

Management Direction, and the 10 year schedule for wildlife improvements make provision for improving fisheries on the Forest by obtaining conservation pools when the opportunity presents itself, and by improving stream habitat. While this clarifies the Forest position, it does not change management or emphasis.

QUESTION NO. 2: HOW MUCH AND WHAT KIND OF ACCESS SHOULD BE PROVIDED FOR USE OF FOREST LANDS?

Historically, the Forest has encouraged access development for administration and use of Forest resources. This had led to environmental and administrative problems. In recent years, there have been attempts made to reduce unplanned roading and improve the needed system roads. This direction would be continued since the road density is in excess of that needed to provide for the resource activities and uses on the Forest. About 1,280 miles of roads would be included on the Forest transportation system, a reduction of approximately 200 miles. In addition, many of the non-system four-wheel drive ways will be closed through area closures. The trail system would remain approximately the same in mileage, but may change in location.

Through travel restrictions, the acreage closed to vehicle use would increase from 83,740 to 110,720 acres. However, the areas with restricted vehicle use would drop from 170,000 acres to 74,980 acres, leaving a net gain in areas with unrestricted vehicle use. The Management Direction is written so that these travel restrictions apply to general administration as well as recreation use. Where access is needed for a specific resource activity or use, entry may be permitted by the Forest Supervisor on a case-by-case basis, and after thorough assessment of the implications of such action.

QUESTION NO. 3: WHAT SHOULD BE THE MANAGEMENT EMPHASIS ON FORESTED LAND FOR TIMBER PRODUCTS AND SAWLOGS?

The Forest Plan increases the emphasis on managing fuelwood to meet increasing demands and maintaining other resource uses of dead and down material. The opportunity to manage for Christmas tree culture is provided. Low value conifers and broadleaf trees will be managed for fuelwood until other markets develop. Aspen stands will be perpetuated where they currently occur. Additional consideration will be given to managing white fir and pinyon for Christmas trees. The General Direction documents the importance of managing forested land for the continued production of trees and wood fiber. High value conifers will generally be managed for sawlog production, which basically continues historic direction.

QUESTION NO. 4: WHAT LEVEL OF MINERAL ACTIVITY CAN FOREST LANDS SUPPORT?

Under current regulations, development of locatable minerals can continue in a manner that will return the land as near as possible to its original productive level and have minimal impact on other Forest uses. This Forest Plan emphasizes administration of mining claims and their eventual reclamation. The Forest cannot support unlimited coal development. Although, excluding the areas

under lease, the land considered available for coal leasing has been increased from 154,100 acres to 399,800 acres. Management Direction, applied through the unsuitability and multiple-use criteria application recorded in Appendix C to the Forest Plan, limits the area leased at one time so as to reduce impacts on other resources, and stay within multiple-use management thresholds.

The Forest can support more oil and gas leasing and development than previously considered. There are fewer areas closed to exploration and development, since many of the impacts from these activities can be mitigated.

QUESTION NO. 5: HOW SHOULD FOREST WATERSHEDS BE MANAGED?

The Forest Plan provides only one significant change in watershed management. This is the need to determine and protect instream flows to assure adequate water for the uses for which the Forest was established. Accordingly, the Forest will limit the removal of water from the natural water system to protect Forest values and the riparian ecosystems.

The Forest Plan requires maintenance or improvement of water quality. Since sediment has been identified as the current major pollutant, General Direction is toward reducing natural sediment flows. The reduction of natural sediment is stressed since most man-caused sediment is insignificant when compared to natural flows. Other resource uses on watersheds will be limited to protect the water values.

Consideration was given to increasing water quality by vegetative manipulation or by snow fencing. It was felt that the land instability and current vegetation would make it very difficult for vegetative management to increase flow. Snow fencing was experimentally pioneered on this Forest many years ago, but the results were poor. Snow fencing does not appear to be economical and could cause environmental damage. However, the Forest would consider allowing interested parties to explore this type of snowpack manipulation.

QUESTION NO. 6: HOW SHOULD FOREST MANAGEMENT RESPOND TO ACTIVITIES ON ADJACENT NON-FOREST LAND?

The Forest should respond positively to activities on adjacent non-Forest lands. Goals in the human and community development area provide for public participation in the evaluation of proposed Forest activities. This includes consultation with adjacent landowners so that their interests can be considered in all cases and protected where feasible. Policy provides for issuance of special uses or permits on the basis of public need. Policy also provides for acquisition of land as needed to meet resource objectives, and the acquisition of easements where title is not needed.

These goals and policies are carried into the General Direction for Forest management.

QUESTION NO. 7: WHAT SHOULD FOREST POLICY BE ON UPGRADING RECREATION FACILITIES AND RECREATION MANAGEMENT?

Forest policy under the Forest Plan will be to reconstruct facilities that are damaged, destroyed or worn out, but to not upgrade sophisticated, high maintenance type facilities. Expansion can occur where it is appropriate.

Recreation management will be emphasized on four Management Units including the DRS - Developed Recreation Sites, UDM - Undeveloped Motorized Recreation Sites, SPR - Semiprimitive Recreation Areas, and DCW - Dark Canyon Wilderness Area. These will provide a broad range in recreational opportunities and experiences.

The program also calls for improved management of sites and access to reduce or eliminate damage from excessive use.

The length of stay will continue to be restricted.

QUESTION NO. 8: WHAT PORTIONS OF THE FOREST SHOULD BE MADE AVAILABLE FOR UTILITIES AND TRANSPORTATION CORRIDORS AND SERVICES?

Through the corridor analysis, Appendix D, the Forest has identified the routes that provide acceptable corridors and windows on the Forest. The existing State highway system is acceptable as transportation corridors. The transportation corridors are not acceptable as utility corridors, nor are utility corridors acceptable as transportation corridors, except the U-46/C-90 and Rattlesnake Paradox corridor between new and old LaSal, Salt Creek Canyon at the north end of the San Pitch Division, and Mill Fork-Indianola at the northwest edge of the Manti Division.

QUESTION NO. 9: WHAT SHOULD BE THE LEVEL OF VEGETATIVE MANIPULATION ON GRASSLANDS, BRUSHLANDS, WOODLANDS, AND TIMBER LAND?

Vegetation should be manipulated at a level that will maintain healthy and diverse plant species. Standards and Guidelines for the various plant species provides direction on the level of vegetative manipulation. In most vegetative types, treatment may occur on a twenty year cycle. An exception would be the ponderosa pine type where a shorter cycle between treatments would be preferable to keep the basal area low, which allows for additional ground cover and more rapid growth rate.

In general, the vegetation on Research Natural and Special Interest Areas and in Dark Canyon Wilderness may be altered only through natural activities such as grazing, browsing, insects, disease and fire. Exceptions to this may occur if the areas have been set aside for a purpose which allows vegetative manipulation.

QUESTION NO. 10: WHAT AREAS REQUIRE IMMEDIATE CONTROL OF FIRES AND WHEN SHOULD FIRES BE USED IN VEGETATIVE MANIPULATION?

General Direction identifies certain areas where immediate suppression will occur. These include areas where there is an opportunity for the loss of life or property, such as recreation areas or areas adjacent to private land.

Otherwise General Direction, Standards and Guidelines provide direction for confinement, containment, or control. This allows for wildfire or planned ignitions to be used for vegetative manipulation if they occur in fire prescription.

QUESTION NO. 11: WHAT SHOULD BE THE LAND MANAGEMENT AND EMPHASIS FOR LIVESTOCK PRODUCTION?

The Forest plan calls for little change in land management or emphasis for livestock production. In general, the objective is to improve range conditions and to bring livestock use in line with forage production levels. The Forest continues to recognize the importance of livestock to social and economic stability of local communities.

QUESTION NO. 12: HOW CAN THE FOREST BEST REHABILITATE LANDS, FACILITIES, AND RESOURCES IMPACTED BY MASS LAND MOVEMENTS, MUDFLOWS, AND FLOODING, AND MINIMIZE THE IMPACTS OF FUTURE SIMILAR EVENTS?

Flooding is predicted to continue in the future. The mass land movements and mudflows could continue to move for several years. Many of the lost facilities and other damages can only be repaired after movement and flooding cease. The Forest has scheduled a multifunctional program for rehabilitation, with the hope that funds might be carried over from one year to the next so they can be obligated when it would serve a useful purpose. The proposed actions are carried in the Landslide and Flood Damage Repair Program.

The Forest has identified some areas where geological, hydrological, or soils data is needed prior to evaluating an activity to assure that potential landslides or flooding will not adversely effect the activity. Consideration of the data becomes a standard or guideline for evaluation of these activities.

Additional geologic, hydrologic, and soils inventories are needed to assure that all sensitive or hazard areas are identified. The Forest Plan schedules these inventories.

QUESTION NO. 13: HOW SHOULD THE CULTURAL, HISTORICAL, AND PLAEOLOGICAL RESOURCES BE PROTECTED?

Generally, where the Forest Service has a reasonable degree of control over an activity, safeguards are adequate. Thus, the issue was not considered significant and was not carried forward into the EIS and Forest Plan. Recent information outlining the level of vandalism and theft, as well as loss of these resources to natural causes, has made it appropriate to reestablish this question as a major issue to address.

Archaeologic and paleontologic sites occur on the Forest in varying densities, from a few to many sites per square mile. Few historical sites exist. Any activity has a potential for disturbing these sites. It is the intent of this Forest Plan to set direction that adequately protects these irreplaceable resources.

The Antiquities Act of 1906, the Historic Preservation Act of 1966, the Archeological Resource Protection Act of 1979, and the National Environmental Protection Act, define cultural and paleontological resource responsibilities and activities. In essence, these laws require that appropriate studies be conducted to provide the information necessary for an adequate review of the effect a proposed undertaking may have on cultural values, as well as giving adequate consideration of modifications or alterations to the proposed undertaking that could avoid, mitigate, or minimize any adverse effects.

Suggested Changes in Direction or Emphasis

The Analysis of the Management Situation identified some problem areas where changes in direction or emphasis may be appropriate. They are listed below by resource area. After each underlined statement of suggested change is the Forest Plan's response.

RANGE

Areas of excessive or under use indicate a need to bring livestock grazing use in line with the capacity of suitable range.

Forest-wide Direction is to bring livestock use in line with grazing capacity.

Some range fences, stock water developments, and corrals have deteriorated and/or no longer serve

the purpose for which they were built.

Improvements that have deteriorated to the point where they no longer serve the purpose for which they were built are scheduled for removal or reconstruction based on the evaluation made in conjunction with Allotment Management Plans. Many of these facilities are included in the 10 year schedule for development. Others are delayed to the second 10 year period, owing to the funding constraint in the first period.

Range revegetation is necessary to restore some areas damaged by past over-use and to restore rangelands converted to other vegetative types through plant succession.

Range revegetation needed to restore rangelands to higher production levels has been identified. The 10 year range development program has scheduled several of these projects. Others are delayed to the second 10 year period or beyond, owing to the funding constraint in the first period.

TIMBER

The current demand for timber is somewhat less than the supply capability. Some timber cannot be harvested in a timely manner to keep the stands thrifty and growing, which leads to a build up in insects and disease.

High value species such as spruce, Douglas-fir, and ponderosa pine will be managed to keep the stands thrifty and growing. Intermediate cuts on these species and harvest of lesser value species, such as aspen and white fir, may be for fuelwood or similar uses in order to maintain the stand viability.

While much of the Forest is roaded, many roads are poorly located or inadequate for timber haul.

Funding for most timber sale road construction would continue to come from stumpage receipts, and most sales will continue to be below cost. Management Direction for timber sales requires that sale activity be coordinated with other resource activities so that major road costs can be shared, and thereby reduce the amount of stumpage receipts taken for road construction.

Increasing demand for fuelwood may provide a means for increasing salvage or harvest of wood products. Access to fuelwood areas may limit this use.

Demand for fuelwood can provide a means for salvage and for precommercial thinning. KV, TSI, and other funds taken from fuelwood receipts should provide a means for improving the use of fuelwood sales as a timber management tool, and to create access to timber stands needing treatment.

MINERALS

Current direction limits surface occupancy in some areas for mineral development which conflicts with certain national direction.

Current direction in unit plans has been relaxed and resolution of the RARE II problem, through the Utah Wilderness Bill, has eliminated many of the surface occupancy conflicts, and has made more land available for mineral activities.

Department of Energy assessments suggested coal mining on the Forest may reach 15 million tons per year by 1985 and approach 29 million tons by 1990. These projections were made prior to the

current market trends, which may delay the date when the projected output levels are reached. A production level for the Forest (area A of the Ferron-Price Land Management Planning Unit) is currently limited to 15 million tons or less per year.

Area "A" concept of the Ferron-Price Plan, which included the Known Recoverable Coal Resource Area (KRCRA), has been altered to include the area containing mineable coal as defined by the Department of the Interior. The Forest cannot control coal production so the 15 million ton limit has been eliminated. The Forest has identified thresholds as Standards and Guidelines in the Forest Plan, and used these as Multiple Use Criteria in evaluating land suitable for coal leasing. See Appendix C.

All Forest surface resources must be protected in considering new areas for leasing and mining.

The Forest Plan contains stipulations or mitigation statements for mineral exploration, leasing development, and mining. These are shown in Appendix B.

The use of uranium is predicted to increase substantially during the mid 1990's, so most operators will continue to maintain their rights through assessment work. The Forest's interests must be protected while this work is done.

The Forest Plan contains stipulations or mitigation statements for mineral exploration, leasing development, and mining. These are shown in Appendix B.

During this planning period, oil and gas leasing, exploration, and development is expected to increase and surface resources must be protected.

The Forest Plan contains stipulations or mitigation statements for mineral exploration, leasing development, and mining. These are shown in Appendix B.

RECREATION

Most campground and picnic facilities are approaching the end of their useful life and many need immediate replacement. Some new developed areas may be needed.

The recreation program schedules reconstruction of facilities that might affect public health and/or safety during this 10 year planning period. New developments are scheduled after the first 10 year period owing to the funding constraint. Some deterioration in facilities may occur as a result of excessive use. There are no new developed areas planned in the first or second planning periods.

Camping, picnicking, and associated recreation activities outside developed sites at times conflict with the production of range forage, wildlife habitat, and clean water.

Areas receiving heavy use for dispersed recreation have been identified and direction prepared to provide guidance in administering the use of these areas. This should reduce conflicts and maintain the quality of recreation opportunity.

Increase snowmobiling and cross country skiing have demonstrated a need for allocating areas to each form of winter recreation.

Forest-wide Direction provides for the assignment of some areas to motorized and other areas to non-motorized recreation use. This has been done and provides some separation for snowmobiles

and cross country skiers. As the conflict increases, additional separation and administration may be needed and the Plan provides for this action.

Demands for solitude and vehicular use conflict, making it necessary to allocate areas to both nonmotorized and motorized use in semiprimitive recreation areas.

Through Forest planning, areas have been identified where semiprimitive recreation opportunities will be provided. Within these areas and others, an additional separation has been made so that some areas are available for motorized use, while others are only available for nonmotorized use.

WILDERNESS

The lands within the Manti-LaSal National Forest have been intensively used by men, and areas available, capable, and suitable for wilderness are becoming scarce. If future generations are to enjoy wilderness, then some areas must be identified and protected.

The Utah Wilderness Bill established the 45,000 acre Dark Canyon Wilderness. This is believed to be adequate for this planning period.

ARCHEOLOGY AND HISTORY

While archaeologic and historic sites are generally protected from abuse by man, natural elements are causing significant loss to these values. If future generations are to enjoy or study these values, then important sites must be identified, protected, and in some cases displayed.

Archeological, historical and paleontological site management is defined in Forest-wide Direction. Direction, Standards and Guidelines provide for the protection of these resources during design or implementation of other resource activities, and to develop interpretive sites as appropriate.

WILDLIFE

Habitat for deer and elk is limited.

Winter habitat for deer and elk is limited on the Manti and San Pitch Divisions. Summer range may be a limiting factor on the LaSal Division. Management Unit Requirements for key and general wildlife habitat have been prepared and certain areas have been assigned to this management emphasis.

Demands for wildlife hunting or viewing will increase with population.

The productive capability of wildlife habitat is limited and cannot meet the projected demands for hunting.

As National Forest System lands are more intensively used for minerals, recreation, and other activities, coordination with wildlife needs will become more critical to the maintenance of wildlife populations and habitat.

Management Unit Requirements provide for protecting wildlife habitat so that minimum viable populations can be maintained for all animals, and populations of high interest species can be increased.

Continuation is required to protect threatened and endangered species.

The Forest-wide Direction requires continued coordination with appropriate agencies on threatened and endangered species.

WATERSHED

Demand for water exceeds supply and demands are increasing. Watersheds on the Forest need to be protected and where possible water supply should be improved.

The Forest cannot meet the demands for water quantity. Management Unit Requirements have been prepared to improve or maintain water quality.

About 46,000 acres have been identified as needing treatment to restore deteriorated watershed, improve water quality, and reduce downstream damage from excessive sediment.

A program for treating deteriorated watersheds has been prepared. It will not be completed within the period allocated in the RPA Program for eliminating this backlog because of financial constraints.

FACILITIES

Many roads and trails show the effects of heavy or long use and little maintenance. The surfacing is gone and drainage facilities are deteriorated.

A facilities management program has been designed to maintain system facilities at a level appropriate to their value. Temporary and permanent closures will be used to protect low standard roads during periods when use could cause significant damage. A modest facility improvement program has been defined. Much of the facility improvement program will be delayed until the second 10 year period, due to funding constraints.

The transportation system needs to be evaluated to assure that it provides the needed access for the proposed resource uses. Once this is done, a construction and maintenance program could be developed to provide adequate access for Forest users.

A program to evaluate existing roads against their perceived need has been scheduled.

SOCIO-ECONOMIC

Local community economics are shifting from an agricultural base toward a more industrial economy. This changes lifestyles, raises the general economic level, and increases need for community services. The shift is primarily based on mining activities. If mining slows, accelerated Forest investment work could be used to counteract rapid changes in employment and thereby help maintain community stability.

Financial constraints during this 10-year period make it impossible to accelerate Forest investment work to counteract rapid changes in employment and maintain community stability.

